BEKO

COLOUR TELEVISIONS

Service Manual
AT-3

GENERAL SERVICING PRECAUTIONS

- Disconnect the TV from the mains supply before discharging the picture tube anode or before removing or refitting any component, circuit board, module or connector.
- Fitting a wrong component or with incorrect polarity of electrolytic capacitors may result in an explosion.
- Measure high voltage only with a high voltage meter or a multimer equipped with a suitable high voltage probe, do not test high voltage by drawing an arc.
- Do not spray any chemicals on or near this instrument or on any of its assemblies.
- Ensure that all power transistors and integrated circuits have their heat sinks correctly fitted before connecting power. Use heatsink compound where necessary.

CONTENTS

SAFETY INSTRUCTIONS
DISASSEMBLY INSTRUCTIONS
EXPLODED VIEWS
WIRING DIAGRAM
TECHNICAL SPECIFICATIONS
OPERATION INSTRUCTIONS
CIRCUIT DESCRIPTIONS
BLOCK DIAGRAM
POWER SUPPLY
IR TRANSMITTER KS51800
TDA 5931-6 VIDEO IF IC
TBA 121 FM SOUND IF IC
TDA 4680 VIDEO CONTROL IC
TDA 4555 MULTISTANDARD DECODER IC
TDA 4565 COLOUR TRANSIENT IMPROVEMENT IC
TEA 2029 C COLOUR TV SCANNING AND POWER SUPPLY PROCESSOR IC
TELETEXT MODULE
NICAM MODULE
CRT MODULE
MONO IF MODULE
STEREO IF MODULE
STEREO AF MODULE WITH DECODER AND POWER AMPLIFIER
PAL/SECAM DECODER MODULE
PAL DECODER MODULE
EAST/WEST MODULE
CHASSIS LAYOUT
SERVICE ADJUSTMENTS
CONVERGENCE ADJUSTMENTS
CRT TABLE
TROUBLE SHOOTING GUIDE
OSCILLOSCOPE WAVE FORMS
CHANNEL TABLE FOR STANDARD B/G
CHANNEL TABLE FOR STANDARD I +
CHANNEL TABLE FOR STANDARD D/K
CHANNEL TABLE FOR STANDARD L
CIRCUIT DIAGRAMS

SAFETY INSTRUCTIONS

SAFETY - PRECAUTIONS

WARNING: The following precautions should be observed.

1. Although the chassis is isolated from the mains supply, some areas of the main PCB are at mains potential. An isolation transformer (250-500 VA) should therefore be connected between the mains and the receiver before service is attempted.

2. Do not install, remove, or handle the picture tube in any manner unless safety, goggles are worn. People not equipped should be kept away while picture tubes are handled. Keep the picture tube away from the body while handling.

3. When replacing chassis in the cabinet, ensure all the protective devices are put back in place, such as: barriers, non-metallic knobs, adjustments and compartment cover or shields, isolation resistor-capacitor, etc.

4. When service is required note the original lead locations and anchor points. Ensure all leads, especially in areas of high voltage, are routed/anchored in their correct locations when reassembling the receiver.

5. Always use the manufacturer's replacement components. Always replace original spacers and maintain lead lengths. Especially critical components which should not be replaced by other makers. Furthermore where a short circuit has occurred, replace those components that indicate evidence of overheating.

6. Before returning a serviced receiver to the customer, the service technician must throughly test the unit to be certain that it is completely safe to operate without danger of electrical shock, and be sure that no protective device built into the instrument by the manufacturer has become defective, or inadvertently damaged during servicing. Therefore, the following checks are recommended for the continued protection of customers and service technicians.

INSULATION

Insulation resistance should not be less than 10M at 500V DC between the mains poles and any accessible metal parts.

Also, no flashover or breakdown should occur during the dielectric strength test applying 3kV AC or 4.25kV DC for two seconds between the main poles and accessible metal parts.

HIGH VOLTAGE

High voltage should always be kept at rated value of the chassis and no higher. Operating at higher voltage may cause a failure of the picture tube or high voltage supply and also, under certain circumstances could produce x-ray radiation moderately in excess of design levels. The high voltage must not, under any circumstances exceed 26kV on the chassis.

X-RAY RADIATION

TUBES: The primary source of x-ray radiation in this receiver is the picture tube. The tube utilised for the above mentioned function in this chassis is specially constructed to limit x-ray radiation for continued x-ray radiation protection, replace tube with the same type as the original BEKO approved type.

PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in BEKO television receivers have special safety related characteristics. These characteristics are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified by marking with a ⚠ on the schematics. The use of a substitute replacement component which does not have the same safety characteristics as the BEKO recommended replacement one, may create electrical shock, fire, X-ray radiation, or other hazards.

TUBE DISCHARGE

The line output stage can develop voltages in excess of 25kV; if the E.H.T. cap is required to be removed, discharge the anode cap to chassis via a high value resistor, prior to its removal from the tube.

DISASSEMBLY INSTRUCTONS
(See also Exploded Views)

BACK COVER REMOVAL
1. Remove screws fixing the back cover to the front frame.
2. Push in side locks with a screw driver and pull back the cover carefully. Taking care not to pull the speaker cable.
3.Disconnect the speaker cable from the chassis and take out the power cord from the cable slot.
4. Diconnect the speaker cable from the chassis (If speaker is fixed to the back cover).

NOTE!
When reassembling the back cover, take care to slide the main chassis board into the guideways located on both sides of the back cover. Figure 2

SPEAKER ASSEMBLY REMOVAL
1.Remove the 2 screws fixing the speaker assembly.
2. Release the four locks and push the assembly out.
3. Remove the 4 screws holding the speakers on the speaker assemly.

SPEAKER REASSEMBLY (For family models)
1.Place the speaker on the speaker assemly; the speaker terminals should be placed towards the front of the TV set.
2. Slide the locks on the assembly through the holes of the back cover until hearing a "click" sound which means that the assemly has fitted in place.
3. Replace the 2 screws (2 pcs) fixing the speaker assemly to the back cover. Figur 3

MAIN CHASSIS REMOVAL
1.Open two guide locks on both sides of the chassis and pull the chassis out.
2. Unplug the mains cable from the chassis.
3. Pull the chassis bac k carefully.

CRT REMOVAL
1. Disconnect power (ST01, 02) degaussing (ST101) and control unit cables (STE03, 04) from the chassis.
2. Discharge the tube and disconnect the E.H.T. cap as detailed in Safety Instructions.
3. Disconnect the tube earthing cable coming from the CRT base board.
4. Disconnect the ST802 connector on the chassis and cable ties holding the cables of ST802 and ST801.
5. Disconnect the CRT board from the neck of the tube, taking care not to damage the tube pins.
6. Place the front cover on soft material so as not to mark the fornt surface or damage the controls.
7. Remove 4 screws securing the picture tube brackets to the front cover.
8. Carefully separate the CRT from the front cover.

CAUTION
Great care must be taken when handling the picture tube.
Always lift the picture tube by holding it firmly arround the face plate.
DO NOT LIFT THE PICTURE TUBE BY ITS NECK..
The picture tube must not be scratched or subjected to excessive pressure.

EXPLODED VIEW

(14"-15" MODELS)

NO	PART NO	DESCRIPTION	QTY
38	056.060	CPT, 15"	1
37	056.737	CPT, 14"	1
36	64A.214	CHASSIS FRONT BRACKET-2	1
35	64A.213	CHASSIS FRONT BRACKET	1
34	033.929	SHIELD WIRE	1
33	011.360	SCREW 3.9x13	2
32	50V.188	TELETEXT MODULE	1
31	54K.208	HOLDER TELETEXT	1
30	54G.203	HOLDER, TX ASSY	2
29	011.814	SCREW 2.9x9.5	2
28	833.215	POWER CORD HANGER	1
27	60U.903	RUBBER CONTACT	1
26	60U.207	PLATE FUNCTION	1
25	011.956	SCREW 3.9x13	1
24	64A.204	POWER CORD HANGER	1
23	60U.203	LENS LED	1
22	51A.301	SPRING POWER KNOB	1
21	64A.211	PLATE REMOTE CONTROL	1
20	60U.206	PLATE FUNCTION I	1
19	60U.210	PLATE FUNCTION II	1
18	60U.212	DECO PANEL	2
17	64A.206	CONTROL UNIT DOOR	1
16	60U.202	LED COVER	1
15	60U.208	POWER KNOB	1
14	64A.202	PANEL	2
13	60U.902	RUBBER CONTACT-II	1
12	60U.901	RUBBER CONTACT-I	1
11	011.814	SCREW	5
10	64A.172	CONTROL UNIT	1
9	---110	CHASSIS PCB	1
8	505.220	CHASSIS BRACKET	1
7	011.507	SCREW CPT (EJOT)	4
6	011.507	SCREW CPT (EJOT)	4
5	710.107	SPEAKER	1
4	011.950	SCREW 3.9x13	4
3	64A.203	HOLDER, BACK COVER	1
2	64A.205	BACK COVER	1
1	65A.201/64A.201	FRONT FRAME 15"/14"	1

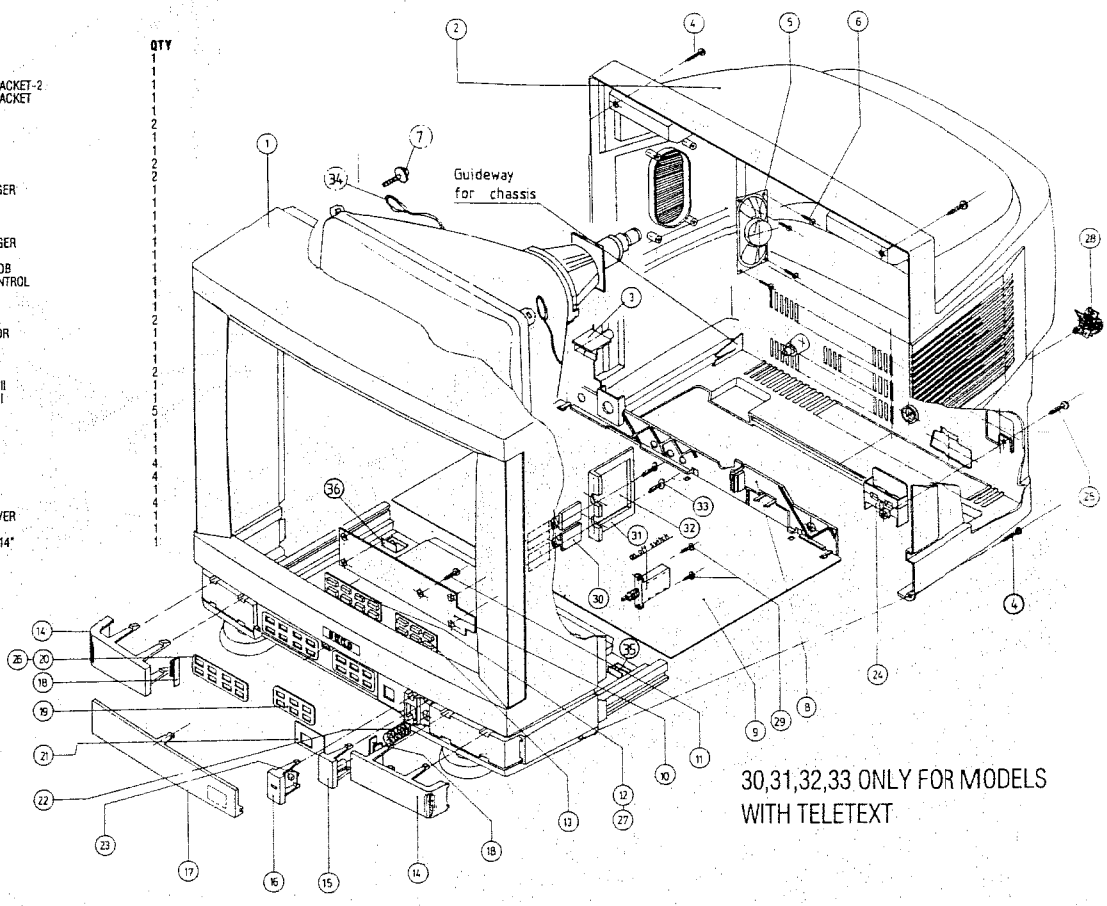


Figure 3

30,31,32,33 ONLY FOR MODELS
WITH TELETEXT

27,28,29 ONLY FOR MODELS
WITH TELETEXT
28 ONLY FOR 21" MODELS

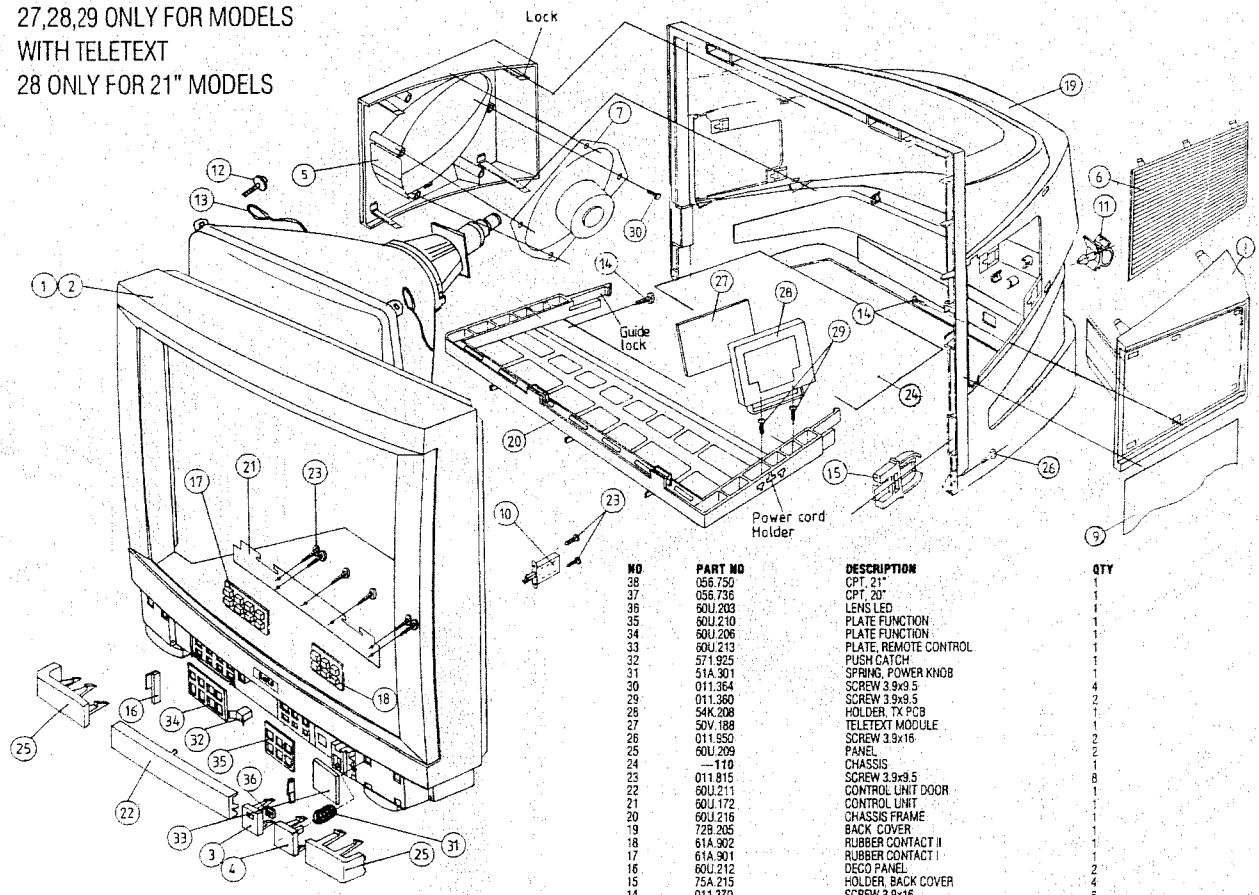
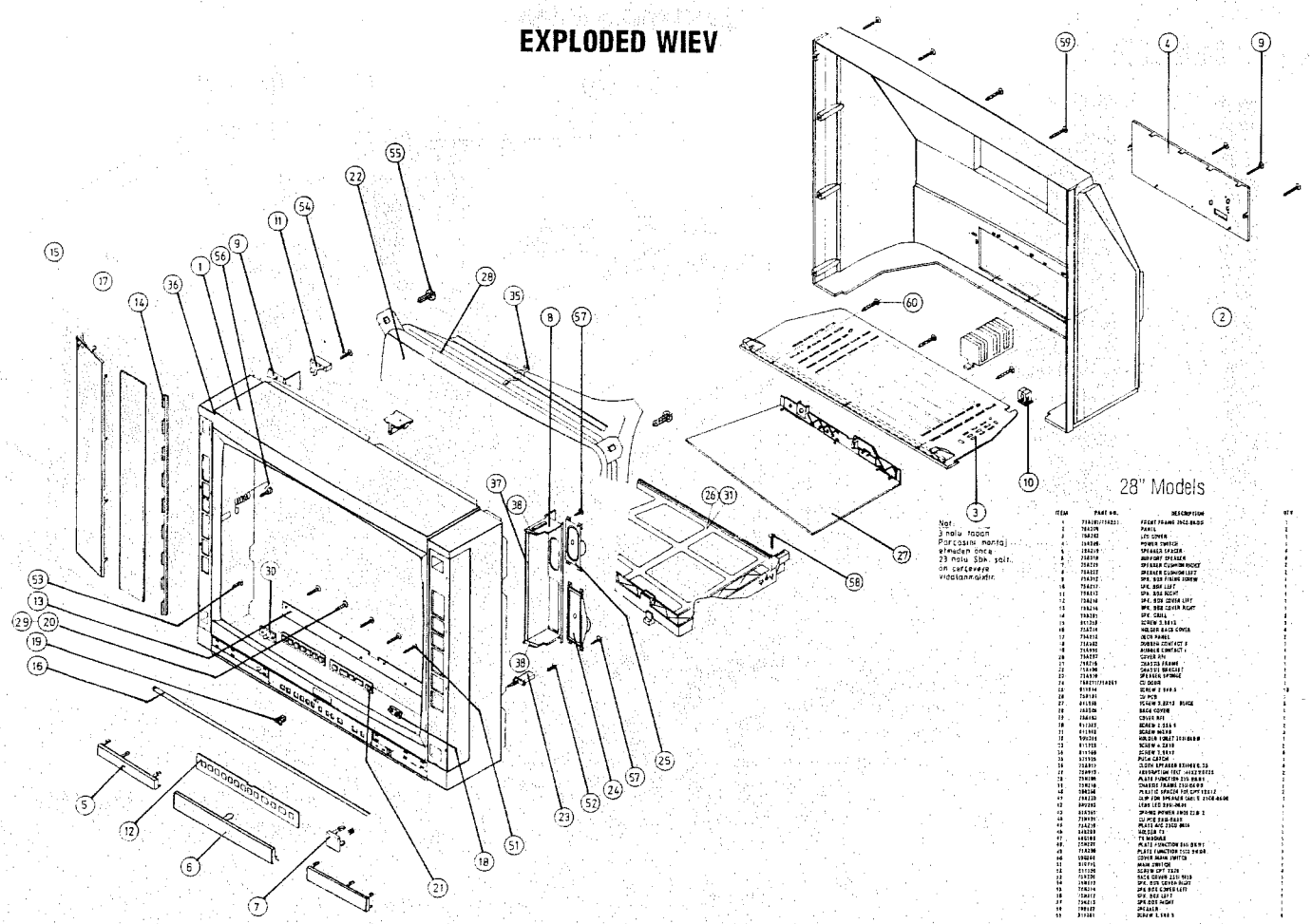


Figure 4

(20"-21" MODELS)

NO	PART NO	DESCRIPTION	QTY
38	056.750	CPT, 21"	1
37	056.736	CPT, 20"	1
36	60U.203	LENS LED	1
35	60U.210	PLATE FUNCTION	1
34	60U.206	PLATE FUNCTION	1
33	60U.213	PLATE, REMOTE CONTROL	1
32	571.925	PUSH CATCH	1
31	51A.301	SPRING, POWER KNOB	1
30	011.364	SCREW 3.9x9.5	4
29	011.360	SCREW 3.9x9.5	2
28	54K.208	HOLDER, TX PCB	1
27	50V.188	TELETEXT MODULE	1
26	011.950	SCREW 3.9x16	2
25	60U.209	PANEL	2
24	---110	CHASSIS	1
23	011.815	SCREW 3.9x9.5	8
22	60U.211	CONTROL UNIT DOOR	1
21	60U.172	CONTROL UNIT	1
20	60U.216	CHASSIS FRAME	1
19	72B.205	BACK COVER	1
18	61A.902	RUBBER CONTACT II	1
17	61A.901	RUBBER CONTACT I	1
16	60U.212	DECO PANEL	2
15	75A.215	HOLDER, BACK COVER	4
14	011.370	SCREW 3.9x16	6
13	033.929	SHIELD WIRE	1
12	011.507	SCREW CPT (EJOT)	4
11	833.215	POWER CORD HANGER	1
10	010.770	POWER SWITCH	1
9	72B.901	CLOTH, SPEAKER	2
8	72W.207	HOLDER SPEAKER	1
7	850.107	SPEAKER	1
6	72B.240	GRID, SPEAKER	2
5	72B.206	HOLDER SPEAKER	2
4	60U.208	POWER KNOB	1
3	60U.202	LED COVER	1
2	81G.201	FRONT FRAME (21")	1
1	72B.201	FRONT FRAME (20")	1

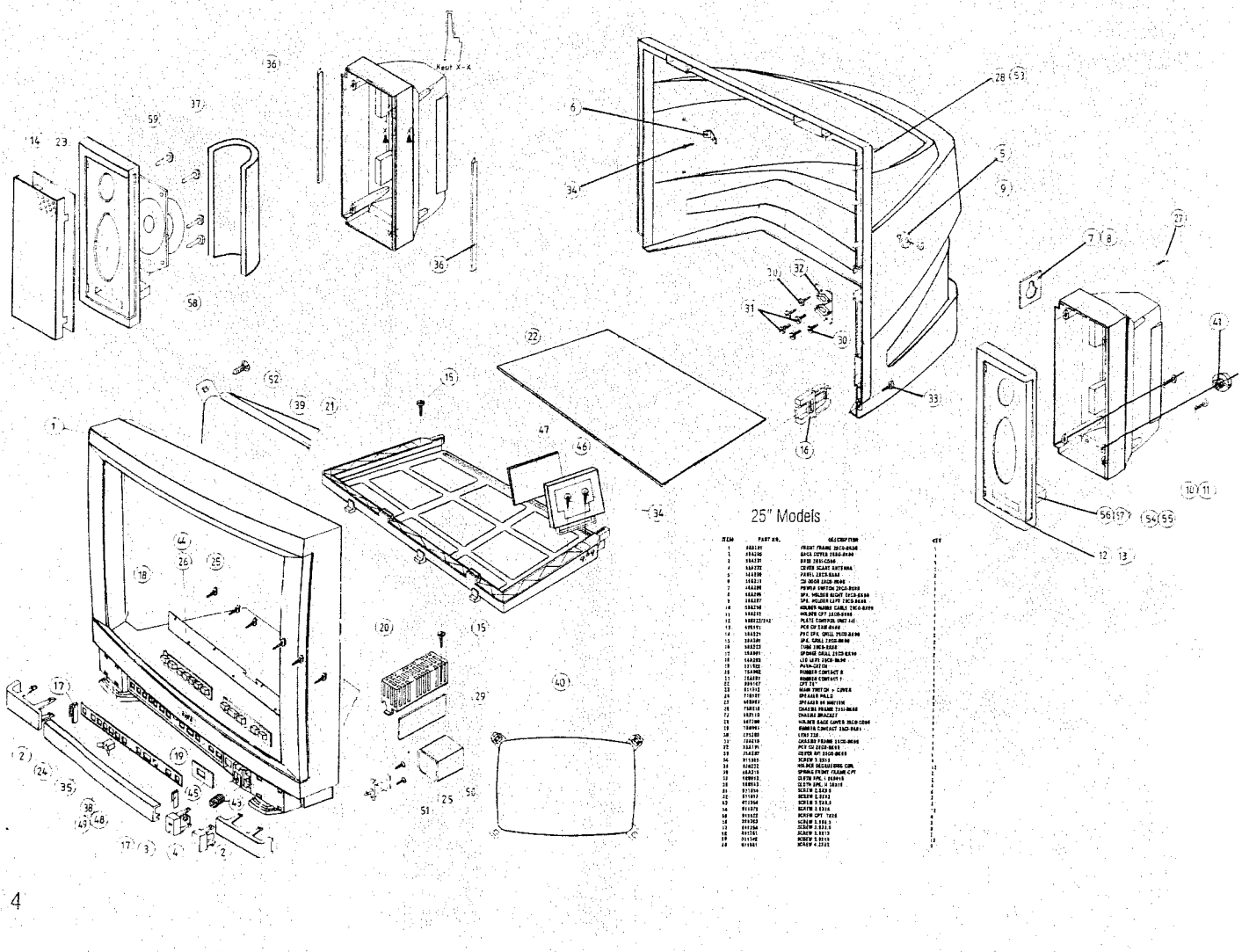
EXPLODED WIEV



28" Models

ITEM	PART no.	DESCRIPTION	QTY
1	7701011774251	FRONT FRAME 28CS-8630	1
2	784279	PANEL	1
3	784282	LCD COVER	1
4	784586	POWER SWITCH	1
5	784619	SPEAKER SPACER	4
6	784618	ANTENNA SPEAKER	2
7	784624	SPEAKER CUSHION RIGHT	2
8	784622	SPEAKER CUSHION LEFT	2
9	784612	SPK. BOX FRAME 28CM	1
10	784617	SPK. BOX LEFT	1
11	784613	SPK. BOX RIGHT	1
12	784618	SPK. BOX COVER LEFT	1
13	784616	SPK. BOX COVER RIGHT	1
14	784281	SPK. GRILL	4
15	811358	SCREW 3.5X15	4
16	784714	HOLDER BACK COVER	4
17	784711	DECK PANEL	1
18	784482	DUBBING CONTACT F	1
19	784781	ANTENNA CONTACT F	1
20	784787	COVER ANT	1
21	784716	28A1CS8 FRAME	1
22	784498	CHASSIS BRACKET	1
23	784838	SPEAKER SPONGE	2
24	7701011774251	CRT DEGN	1
25	811344	SCREW M 3X8 S	2
26	784181	28 PCB	1
27	811358	SCREW 3.5X15 BLACK	6
28	784586	BACK COVER	1
29	784482	COVER ANT	1
30	811362	SCREW 3.5X6 S	1
31	811358	SCREW WASH	1
32	784784	HOLDER TUBE 28CM8630	1
33	811358	SCREW 4.5X10	1
34	811358	SCREW 3.5X10	6
35	784619	PLUG CATCH	1
36	784813	28CM SPEAKER 8OHM/6.5W	1
37	784613	ABSORPTION FELT 440X100X25	2
38	784186	PLATE FUNCTION 28CM8630	1
39	784616	CHASSIS FRAME 28CM8630	1
40	784284	PLASTIC SPACER FOR CPT 28A12	4
41	784220	DUMP FOR SPEAKER CABLE 21X8-8630	1
42	784282	LENS LCD 28CM8630	1
43	8182361	SPRING POWER ANOD 22.8 2	1
44	784619	CU PCB 28CM-8630	1
45	784239	PLATE ANT 28CM 8630	1
46	5482863	HOLDER 75	1
47	4482863	TV MODULE	1
48	784639	PLATE FUNCTION 28CM8630	1
49	784286	PLATE FUNCTION 28CS 8630	1
50	5782841	COVER MAIN SWITCH	1
51	5787741	MAIN SWITCH	1
52	5111256	SCREW CPT 7X26	1
53	784779	BACK COVER 28CM-8630	1
54	784773	SPK. BOX FRAME RIGHT	1
55	784774	SPK. BOX COVER LEFT	1
56	784615	SPK. BOX LEFT	1
57	784613	SPK. BOX RIGHT	1
58	784169	SPEAKER	2
59	811681	SCREW 4.5X8 S	1

Not
3 nolu fişin
Parçasını montaj
etmeden önce
23 nolu Sünger
on sarfetmeyin
Montajınız



25" Models

ITEM	PART no.	DESCRIPTION	QTY
1	4681491	FRONT FRAME 25CS-8630	1
2	8784280	BACK COVER 25CS-8630	1
3	7844291	BASE 25CS-8630	1
4	7844292	COVER SCART BOTTOM	1
5	7844290	PANEL 25CS-8630	1
6	7782211	CU 25CM 25CS-8630	1
7	7446289	POWER SWITCH 25CS-8630	1
8	7682291	SPK. HOLDER RIGHT 25CS-8630	1
9	7682291	SPK. HOLDER LEFT 25CS-8630	1
10	7782290	HOLDER MAINS CABLE 25CS-8630	1
11	7782272	HOLDER CPT 25CS-8630	1
12	4682227242	PLATE CONTROL UNIT 14	1
13	4781771	PCB CU 25CS-8630	1
14	7844291	PVC SPK. GRILL 25CS-8630	1
15	7844289	SPK. GRILL 25CS-8630	4
16	7682223	TUBE 28CS-8630	1
17	7844991	SPONGE GRILL 25CS-8630	1
18	7682283	LCD LENS 25CS-8630	1
19	7117552	PVC 25CS	1
20	7554982	RUBBER CONTACT R	1
21	7554981	RUBBER CONTACT F	1
22	8084167	CPT 25"	1
23	8111152	MAIN SWITCH + COVER	1
24	7781877	SPEAKER 8ΩLS	2
25	4782891	SPEAKER 8W 8OHM/8W	2
26	7682518	CHASSIS FRAME 25CS-8630	1
27	4682120	CHASSIS BRACKET	1
28	4682280	HOLDER BACK COVER 25CS-8630	4
29	7684981	RUBBER CONTACT 25CS-8630	1
30	4782280	LENS 25C	1
31	7844219	CHASSIS FRAME 25CS-8630	1
32	7844191	PCV CU 25CS-8630	1
33	7844287	CENTER KEY 25CS-8630	1
34	8111853	SCREW 3.5X15	1
35	7844282	HOLDER DEGAUSSING COIL	1
36	4682216	SPRING FRONT FRAME CPT	1
37	8111858	SCREW 3.5X15 S	1
38	7682853	CENTER SPK. H 28CM	1
39	8111856	SCREW 3.5X8 S	1
40	8111852	SCREW 3.5X12	1
41	8111854	SCREW 3.5X6.5	1
42	8111870	SCREW 3.5X16	1
43	8111422	SCREW CPT 7X26	1
44	8111863	SCREW 3.5X6.5	1
45	8111854	SCREW 3.5X6.5	1
46	8111581	SCREW 3.5X13	1
47	8111582	SCREW 3.5X10	1
48	8111681	SCREW 4.5X15	1

WIRING DIAGRAM

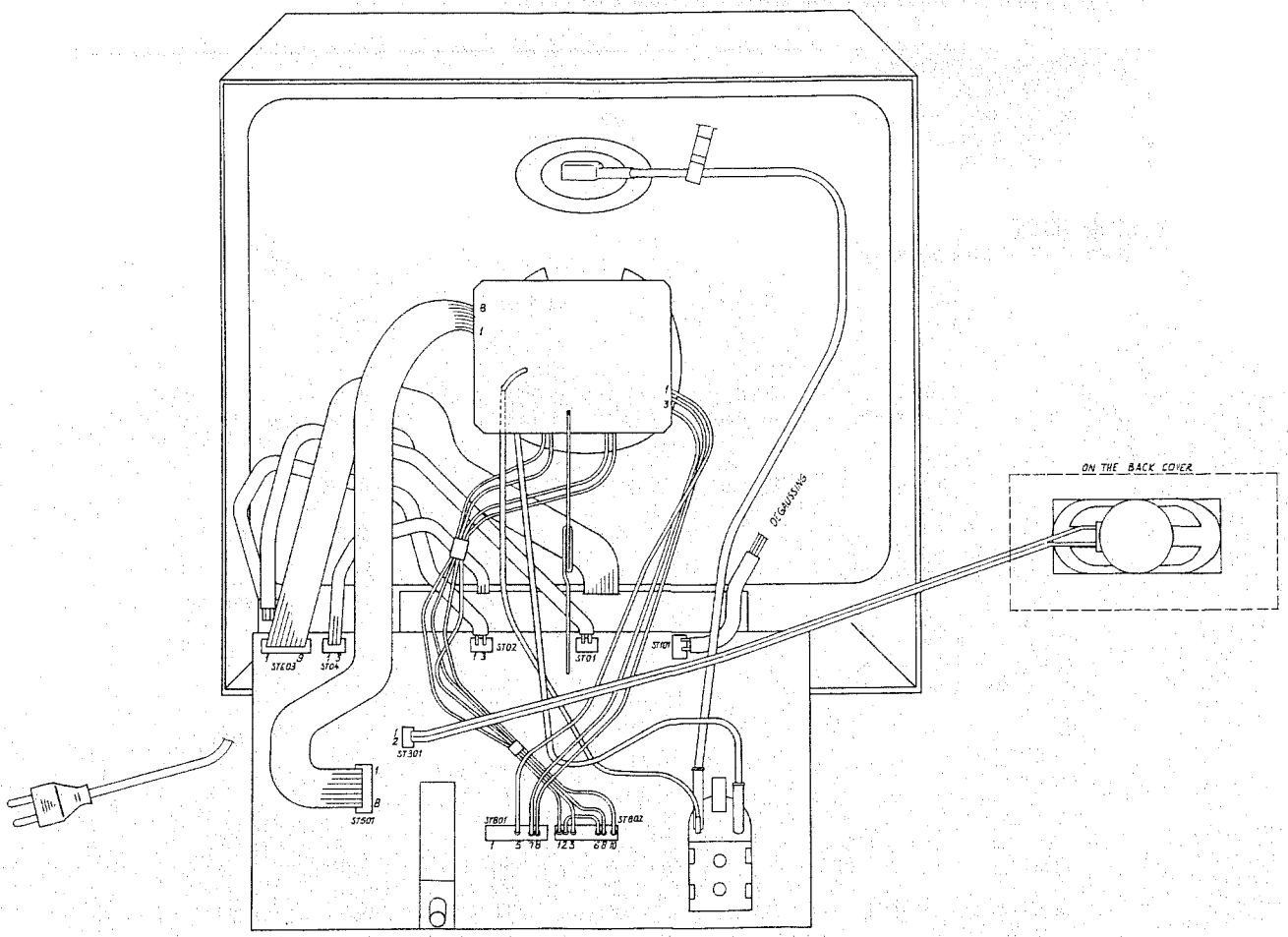


Figure 5

TECHNICAL SPECIFICATIONS

1. OPERATING CONDITIONS

1.1	POWER SUPPLY	140 TO 270 VAC 50/60 Hz
1.2	NOMINAL OPERATING VOLTAGE	220 VAC
1.3	TEMPERATURE RANGE	0 TO 45 DEGREES C
1.4	HUMIDITY RANGE	YEAR'S MEAN = 75% MAX = 95%

2. RF SECTION

2.1 RECEIVING CHANNELS FOR VHF/UHF BAND

	CCIR B/G	UK I	FRANCE L	OIRT D/K
VHF BAND				
BAND I	CH 2-4	CH 1-5	CH 2-4	CH 1-5
BAND III	CH 5-12	CH 6-12	CH 5-12	CH6-12
CABLECH ANNELS	S1-S19,S20-S41	S1-S19,S20-S41	S1-S16, S21-S41	S1-S19-S22-S341
UHF BAND				
BAND IV-V	CH 21-69	CH 21-69	CH 21-69	CH 21-69

		MIN	NOM	MAX	UNIT
2.2	GAIN LIMITED SENSITIVITY INPUT SIGNAL LEVEL FOR STANDARD VIDEO OUTPUT VOLTAGE				
	BAND 1/3	–	20	–	dB (µV)
	BAND 4/5	–	23	–	dB (µV)
2.3	NOISE LIMITED SENSITIVITY INPUT SIGNAL LEVEL FOR 30 dB (S+N)/N-RATIO, WEIGHTED, CCIR REC 567				
	BAND 1/3/4/5	–	30	–	dB (µV)
2.4	SELECTIVITY HF+IF				
2.4.1	IF FREQUENCIES				

	B/G	I	L	D/K
Picture Carrier	38.9	38.9	38.9	38.9
Sound Carrier	33.4	32.9	32.4	32.4
Colour Carrier	34.47	34.47	34.47	34.47

		MIN	NOM	MAX	UNIT
2.5	VOLTAGE STANDING WAVE RATIO				
	BAND 1/3	–	2	4	–
	BAND 4/5	–	2	4	–
2.6	MAXIMUM INPUT SIGNAL LEVEL				
	BAND 1/3	100 dB µV (MAX)			
	BAND 4/5	100 dB µV (MAX)			

3. VIDEO OUTPUT SECTION

		MIN	NOM	MAX	UNIT
3.1	VIDEO OUTPUT VOLTAGE (measured on cathode with lowest output level, contrast control and drive control at max.	90	100	–	V
3.2.	FREQUENCY RESPONSE				
a)	INPUT AERIAL STANDARD, HF SIGNAL				
	STANDARD B/G · D/K · I+ · L	–10	–7	–	dB
b)	INPUT: SCART PIN 20				
	STANDARD B/G · D/K · I+ · L		–8	–6	– dB

4. CHROMA SECTION

4.1	PAL/SECAM				
4.1.1	COLOUR CAPTURE RANGE	+–300	+–500	–	HZ
4.1.2	PHASE ERROR OF REFERENCE CARRIER	–	+–5	10	DEGRESS
4.1.3	COLOUR KILLER	30 dB µV (NOMINAL)			

5. SOUND SECTION

		MIN	NOM	MAX	UNIT
5.1	SCART OUTPUT				
5.1.1	S/N RATIO	40	45	–	dB
5.1.2	NOISE LIMITED SENSITIVITY	38 db/V (NOMINAL)			
5.1.3	AM SUPRESSION RATIO AM MODULATION=39%	60 db (NOMINAL)			
5.1.4	HARMONIC DISTORTION fm= 1 KHz	10%			
5.2	POWER OUTPUT (at 10% distortion) fm= 1KHz	4.0 W Rms (for mono sets) 2x7 W Rms (for stereo sets)			

6. SYNCHRONISATION

6.1	LINE FREQUENCY LOCKING RANGE	:	+- 300 HZ
6.2	VERTICAL FREQUENCY LOCKING RANGE	:	+- 5HZ

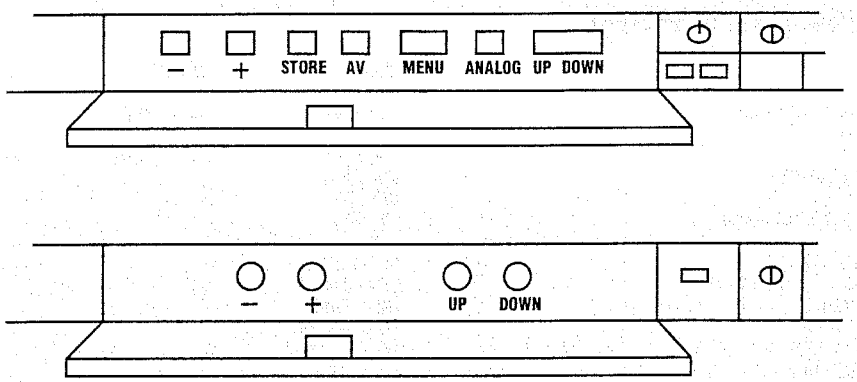
7. PICTURE TUBE DRIVE SECTION

			25"/28"	20" / 21"	14" / 15"
7.1	B+SUPPLY VOLTAGE (AT Ib=0)	:	145+1 VDC	125+- 1 VDC	- -
7.2	EHT	:	27+-0,5 kV	25.0 +- 0.5 kV	23.0-0.5 kV
7.3	FOCUS VOLTAGE	:	MIN 25,6 %	- -	- -
			MAX 38%	- -	- -
7.4	GRID 2 VOLTAGE RANGE	:	MIN 300 V	- -	- -
			MAX 1350 V	- -	- -
7.5	HEATER VOLTAGE	:	6.2+- 0.2 Vms	- -	- -
7.6	FRAME OUTPUT VOLTAGE	:	250+- 8 Vpp	- -	- -
7.7	200V OUTPUT	:	200+- 5VDC	- -	- -
7.8	12V OUTPUT	:	12.0+- 0.5 VDC	- -	- -
7.9	17.5V OUTPUT	:	17.5+- 0.5 VDC	- -	- -
7.10	21V OUTPUT	:	21+-0.5 VDC	- -	- -
7.11	5V OUTPUT	:	5.0+- 0.5 VDC	- -	- -
7.12	8V OUTPUT	:	8.0+-0,5 VDC	- -	- -
7.13	RETRACE TIME	:	11.0+- 0.5 MS	- -	- -

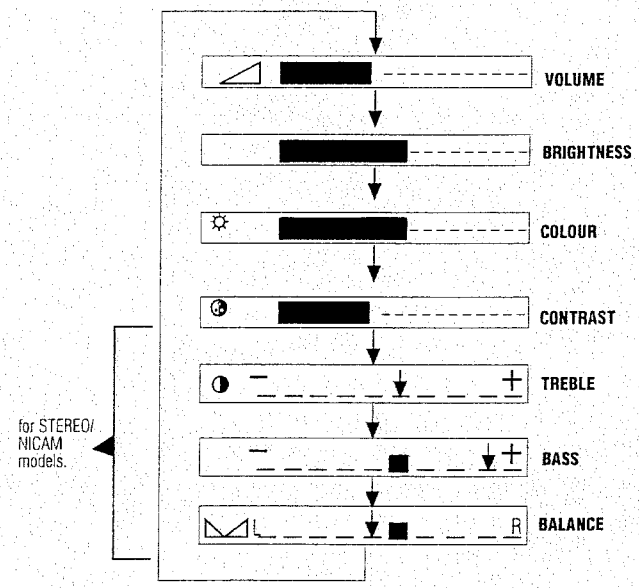
8. OTHERS

8.1	AMBIENT OPERATING TEMPERATURE	:	0-45 DEGREES C
8.2	STORAGE TEMPERATURE	:	-10 TO + 85 DEGREES C
8.3	POWER CONSUMPTION	:	90 Watts (max) 14", 15", 20", 21" 120 Watts (max) 20", 21" (Stereo models) 135 Watts (max) 25", 28"
8.4	SAFETY	:	IEC 65
8.5	X-RAY RADIATION	:	ACC. IEC 65
8.6	Picture Tube Dimensions	:	14" (37 cm), 15" (40 cm) 20" (51 cm), 21" (55 cm) 25" (63 cm), 28" (70 cm)

GENERAL OPERATION

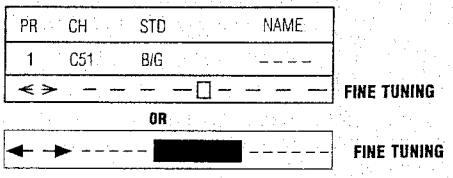


⏻	Power ON/OFF switch
⏻	Stand-by / remote control sensitive indicator.
Three Colour Display LED	Stereo/bilingual + remote control sensitive indicator. (only for some models)
	Orange colour means broadcast is stereo or NICAM
	Red colour means broadcast is dual language and first language selected.
	Green colour means broadcast is dual language and second language selected.
UP/DOWN	Increase/Decrease programme numbers and values at Menu bar.
ANALOGUE	This button is used to select any item among analogue adjustments.



Use "+/–" buttons to adjust desired values.

MENU This button is used to select MENU bar or fine-Tuning.



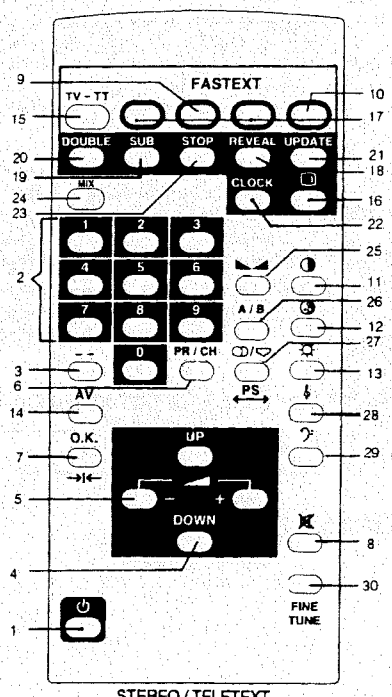
Use "+/–" buttons to shift left or right and UP/DOWN buttons to increase or decrease values at MENU bar.

AV Audio / Video selection
STORE To memorize the set-ups.
+ / — This buttons are used to adjust analogue values and to shift the cursor left or right in Menu bar.
IR Receiver IR sensitive receiver is concealed for remote control.
Location (the place of this object is different for each model.)
NOTE : BUTTONS AND INDICATORS ON THE LOCAL CONTROL PANEL OF YOUR TV, PRESENT OR NOT DEPENDS ON ITS MODEL.

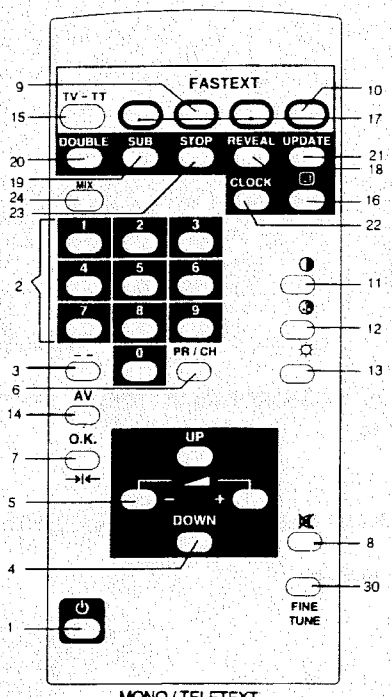
OPERATING WITH REMOTE CONTROL

1- Stand-by button
2- Ten-key programme buttons
3- Two digit buttons
4- Up/Down buttons
5- Volume control/ Plus-Minus buttons
6- MENU button
7- Memory/Normalisation button
8- Muting
9- Child lock
10- Off-timer
11- Contrast selection
12- Colour selection
13- Brightness selection
14- AV Button
15- Teletext selection button *
16- Index page button* / Display button
17- Colour linked buttons*
18- Reveal*
19- Subpage*
20- Enlarge*
21- Update*
22- Clock*
23- Stop *
24- Mix *
25- Balance **
26- Stereo-Mono/ Dual A-Dual B selection**
27- Quasi stereo / Space wide **
28- Treble control **
29- Bass control **
30- Fine Tuning ***

* These buttons are for TELETEXT function only. Not functional on non-teletext tv sets.
** These buttons are for STEREO/NICAM function only. Not available on non-stereo tv sets.
*** Not available with SDA 20563-A512

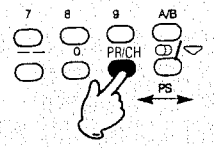


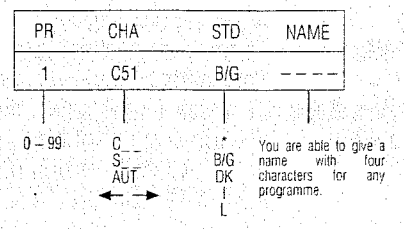
STEREO / TELETEXT



MONO / TELETEXT

Tuning Procedure





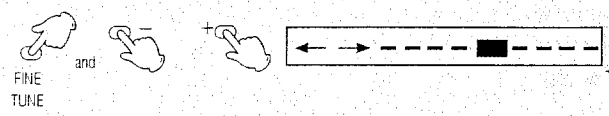
Use buttons "+/- " to shift the flashing cursor around.
Use buttons "UP/DOWN" to select the desired values.
Note: It is a tv-system select switch. Normal, it is set to BG or can be changed between BG-DK or BG-L

Channel Search

It is possible to select the broadcasting channels in your local area directly.

Automatic channel search

Press O.K. button. Menu bar disappears. Channels are stored on the selected programme numbers. FINE TUNE button will allow you to manually adjust for optimum reception within the bandwith.



PR : Programme column. You can select any one of the 100 programmes.

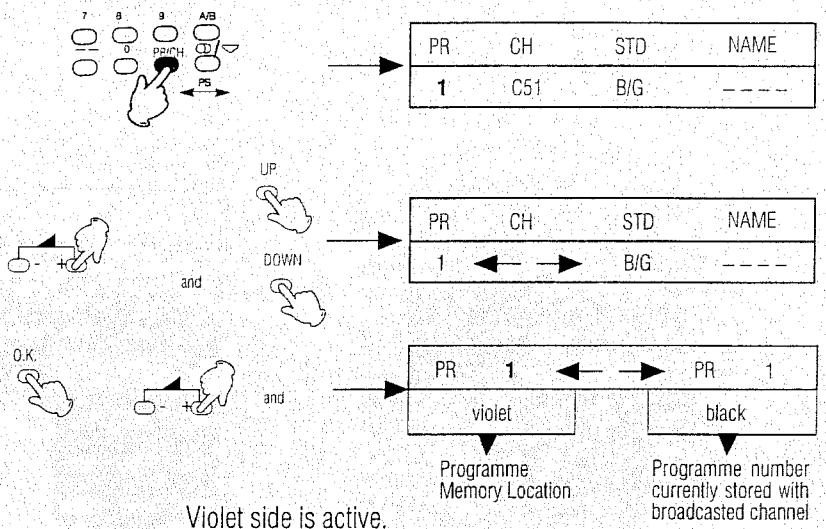
CHA : Channel column.

C : Prefix presenting channels
VHF BAND I/ BAND III
UHF (CH 21 - 69)

S : Prefix presenting cable channels
VHF BAND S (S1 - S10)
VHF BAND S1 (S11 - S20)
HYPERBAND (S21 - S41)

AUT : Press O.K. button. All channels being broadcasted will be automatically searched and stored.
Re-arranging the TV programmes in a different order. It will also appear after AUT function.

Re-arrangement of the TV programmes

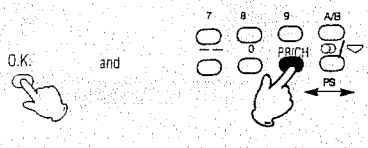


Violet side is active.

Use "+/–" and number buttons to select the programme which you want to assign to desired programme memory location.

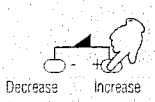
Now the channel on programme number 13 moved to programme number 1.

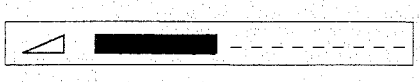
To store this function;



To change the picture and sound settings

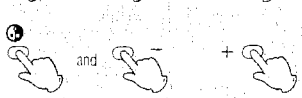
Volume



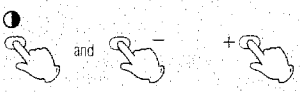


Brightness

Colour



Contarst

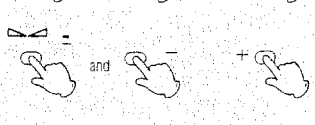


Followings are for stereo/NICAM models only.

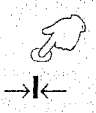
Treble

Bass

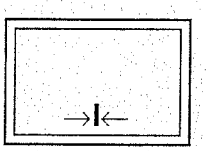
Balance



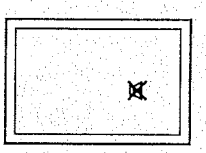
Normalisation



to restore picture and sound to your desired settings after some changes.



If the volume is wanted to be silent for a short time.



The button marked on the handset will show the programme number that you are currently viewing on the screen.

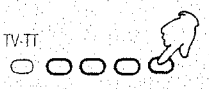
To select stand-by mode

Stand-by

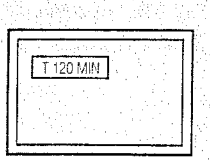
Picture and sound switch OFF temporarily. The red indicator on the TV set will light up.

To switch ON simply press any of programme and AV buttons or UP/DOWN buttons.

Sleep Timer



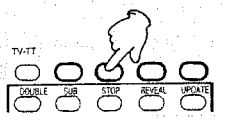
The TV set can be switched OFF in steps 30, 60, 90 and 120 minutes downwards. Press blue framed button to select Sleep timer mode.



Press same button to select desired time. Than O.K.
At the end of selected period, the set will switch to-stand-by.

CHILD LOCK (LOCKING)

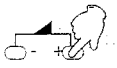
Press green framed button to select child lock mode.



Password 4 or all — Programmes which will be locked

XXX PR — — — — — — — — — —

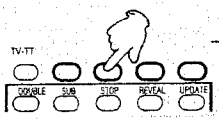
blue



XXX PR — — — — — — — — — —

blue

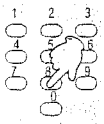
CHILD LOCK (UNLOCKING)



XXX PR 07 12 39 — —

red

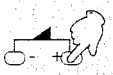
enter your password



XXX PR 07 12 39 — —

violet

Now, you can watch locked programmes until Power-off. If you want to watch locked programmes after power OFF-ON too, you should make clear the programme numbers. For this:



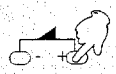
XXX PR 07 12 39 — —

violet

XXX PR — — — — — — — — — —

violet

enter your password

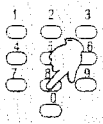


and

XXX PR — — — — — — — — — —

violet

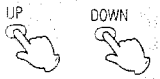
press O.K. button to finish operation. The procedure is the same for the all programme locking.



XXX PR 0 — 49

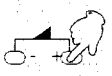
But in this case, you must give your password after every ON/OFF.

If you want to clear child lock, simply operate the tv when pressing UP and DOWN buttons together on your tv's local control. You will see this on the screen:
Do not preess any button, just power OFF the set, then ON.



XXX PR 07 12 39 — —

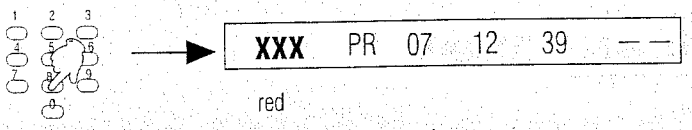
blue



XXX PR 07 12 39 — —

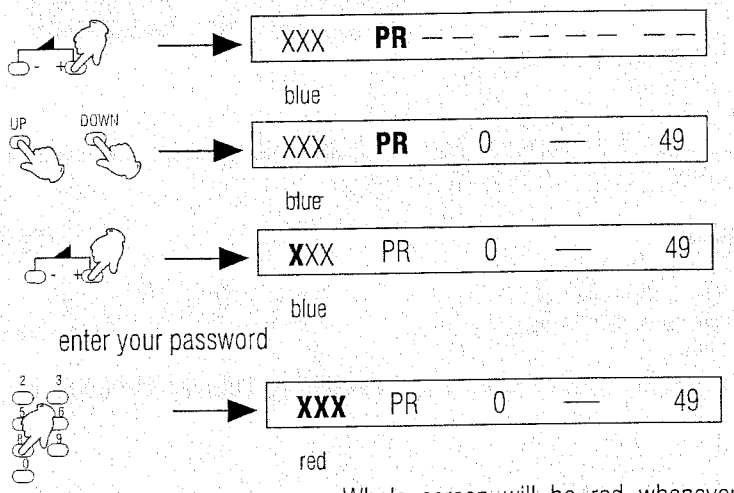
blue

enter your three number password which will not be displayed on the screen.



Press O.K. button after your operation.
Given four programmes, are locked until unlocking operation.

If you want to lock all programmes.



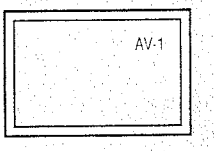
Whole screen will be red whenever someone tries to operate the tv. unless exact password has been given. When the child lock function is activated you will not be able to reach MENU to prevent an unwanted change of the child lock status.

External Connection Modes

Pressing this key switches sequential to the different external sources.

AV1 / AV2 / S-VHS / AV1-RGB

Availability of this connections depends on the system configuration/model.



With the SCART socket (normaly one or two scart sockets, two or S-VHS socket depends on the model) at the rear of your TV set, video and audio signals can be transmitted either from TV to any external set (which may be VCR, Computer or Satellite Receiver etc) or from external set to TV.

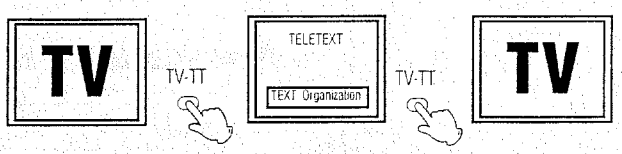
If your VCR or Camcorder is equipped with Super VHS facilities, you can enjoy better resolution picture with the use of the S-VHS.

This television has been produced so that a video recorder can be connected direct to the aerial socket by using the standard coaxial lead supplied with the VCR. In this case tune the TV set to the signal from the VCR, this will usually be the channels among 30 to 39, however check the information plate at the rear of the VCR. You may need to make FINE TUNE upon necessity.
NOTE: Always read the instructions supplied with the external equipment before connecting to this set.

There are external speaker outputs at the rear cover of the set in some models especially in stereos. You can connect ext. speakers 4 ohms proper to relevant specifications using special connectors. In this case internal speakers will mute.

TELETEXT (optional)

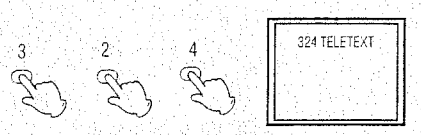
Your TV set may be fitted with a Standard Teletext Decoder. In Teletext mode you have the possibility to get informations about many interesting topics. (e.g. news, weather forecast, sports, tv schedule, stock exchange etc.) These informations are visible at any time independent of the actually transmitted TV programme.
Your TV's Teletext Decoder has some Multipage Features:
TOP Text
FAST Text
32 page memory
4 page favorite



Press TV-TT button on the handset.
This will take you from
picture mode to TELETEXT mode.
When pressed again it will take you back to picture mode. At the very beginning of the teletext mode, Decoder will display "TEXT-Organization..."

Page Selection

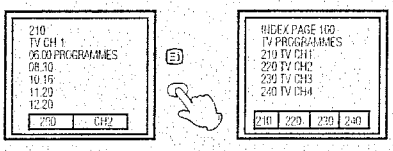
Use number buttons to reach
the desired page in three-digit form.
You will see your entry on the left
of the header line.



If selected page is not broadcasted decoder will detect and display "Page XXX is not available..." for a short time.

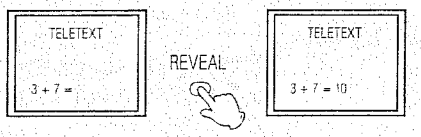
INDEX

Press this button to return to the main index page. Depending on the way information is transmitted by each TV channel, this index button may need to be pressed more than once to return to main index page.



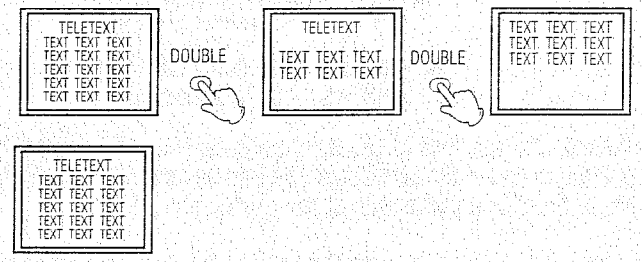
REVEAL

Sometimes a teletext page contains concealed information, for example in a quiz or puzzle. To display the concealed information press this button.



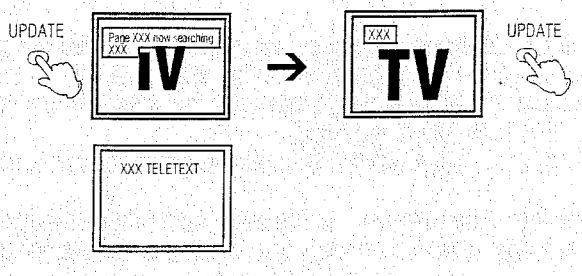
DOUBLE

This will expand the top or bottom half of the page to double height.



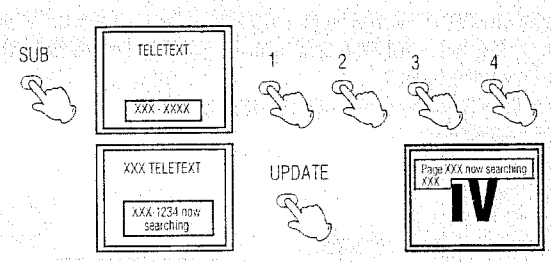
UPDATE

This button allows you to return to TV programme but still displays the page number it is searching for.
When the page is found "Page XXX now searching..." disappears.



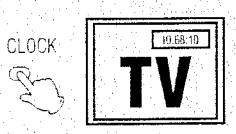
SUB

Some text pages have extension or sub-pages. These can be viewed by keying in the four digit number using the numeric keypad. But it may take some time for the automatic changing of the subpages to reach the subpage you require. It is possible to enter your required sub-page and continue watching the normal programme until the correct sub-page is found. Some stations broadcast ALARM PAGE function. In this case 4 digits are used for alarm time. Such stations will tell you how to use this function on special pages.



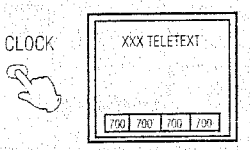
CLOCK

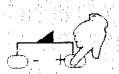
This button has two functions;
First: a real time clock transmitted constantly while the channel is being broadcasted.
Second: This function is operative in TELETEXT mode. You can select special four page favorite memory.



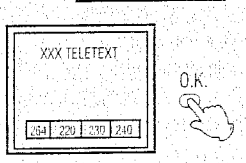
This function is operative in TV mode

Register:



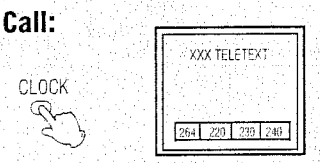


See the first coloured block flashes. Enter the numbers of your four favorite pages using ten-key buttons.

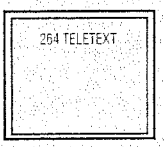


When you store your favorite pages using O.K. button, every time you can reach to this pages using colour coded buttons.

Call:



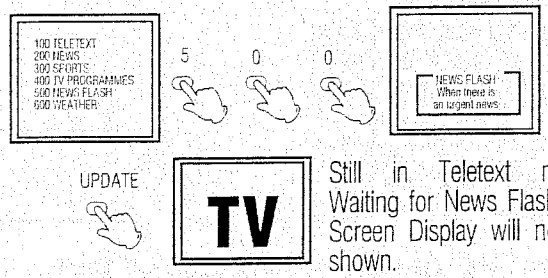
Press red framed button



STOP

This button allows you to "hold" certain pages of teletext information on individual subject from. If there is a NEWS FLASH page, (see subject index) to view this page only select that page.

Whenever an updated newsflash is available, the updated news item will appear over the normal TV programme. Press the UPDATE button to make the news information disappear. Updated news will appear again when the news changes.



Still in Teletext mode. Waiting for News Flash. On Screen Display will not be shown.

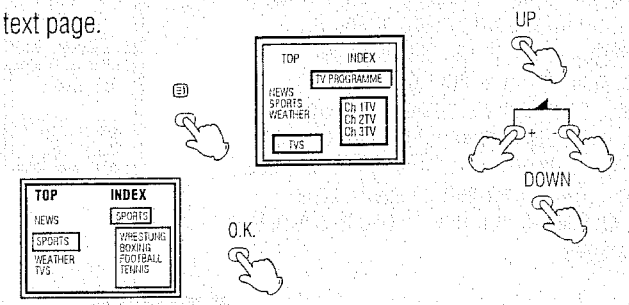
FASTEXT

Coloured buttons are employed for FASTEXT. Whenever you have selected a page, several subject titles may appear at the bottom in coloured forms. By pressing one of these buttons you will go straight to that particular area corresponding to the colour of the subject title without having to select the page using the numeric pad, to give you more control over page selection.

TOPTEXT

The Top system provides menu-prompted guidance to enable you to select text pages quickly and easily.
Menu prompting is performed with colour coding, in two different ways:
- With the Top index page
- With the coloured menu line below the text page.

Index page shows the subject areas of a text programme in the right-hand blue text field, and the individual subjects within a particular subject area in the left hand yellow text field. Once the page has been written on the screen the menu line will be showing the next possible subject (yellow) and the next possible subject area (blue).



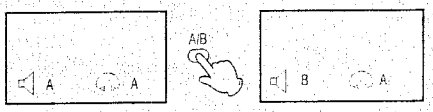
Teletext Considerations

A good antenna system, and a clear, reflection free reception is essential to minimize teletext errors. Even with good reception, some errors or corruption (missing or incorrect character or word) may occur occasionally. The errors are normaly corrected after a few seconds.

STEREO SOUND SYSTEM (optional)

Your TV set is equipped with Analog Stereo (A2) decoder giving you the choice of high quality Stereo sound or Dual Language sound when broadcasted.
The television will be automatically switched to STEREO when the decoder detects Analog Stereo signal and will display "STEREO ⓞⓞ " at the bottom of the screen. At the same time, on some models pls. look at GENERAL OPERATION, the three colour display LED will bright orange on tv.

Some programmes are trasmitted with two different languages instead of stereo sound. The television will be switched to first channel and display this on the screen. If your tv model has three colour display led, it will bright at first language red, at second language green.



Space

This function seems to enlarge the distance between left and right speakers so that a special acoustic effect in sound quality is attained. Space function can be activated only if broadcast is stereo.

Quasi-Stereo

During mono rsp. a dual transmision. You can feel stereo effect.

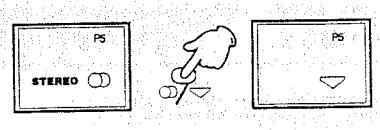
You can control Bass, Treble and Balance adjustments at your leisure.

NICAM DIGITAL STEREO (optional)

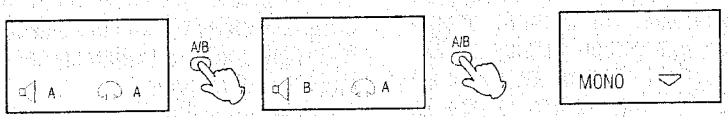
Your TV set is equipped with NICAM and Analog Stereo (A2) decoder on the same board.
The NICAM digital system provides either stereo or two languages with a sound quality similar to that of CD.

The television will be automatically switched to NICAM when the decoder detects NICAM Stereo signal and will display on the screen. At the same time, for some models the three colour display LED will bright orange on tv.

The NICAM Sound may be disturbed by hissing or cracking noise due to the station signal being too weak. This interference can be eliminated by switching over from NICAM to analog FM (regular audio) mono reproduction.



Some programmes are transmited with dual language. The tv will be switched to first channel and display this on the screen. If your tv is a model with three colour display led, it will bright at first language red, at second language green.



First Language Second Language Regular Audio

You can control Bass, Treble and Balance adjustments at your leisure.

A USEFUL TABLE FOR SWITCHING OPERATION

TYPE OF BROADCAST	SWITCHING OPERATION
REGULAR AUDIO	REGULAR AUDIO
REGULAR AUIDO + NICAM STEREO	NICAM STEREO → REGULAR AUDIO
REGULAR AUIDO + NICAM DUAL	NICAM DUAL A → NICAM DUAL B → REGULAR AUDIO
REGULAR AUIDO + NICAM MONO	NICAM MONO → REGULAR AUDIO

- All the operations above told are for the system, all sound channels are fully brodcasted.

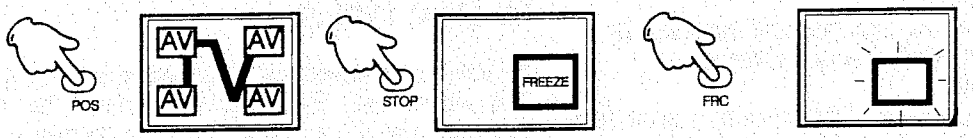
PICTURE IN PICTURE (optional)

Your TV set offers you the option of displaying monitor pictures from the external sources AV1/AV2/S-VHS/AV1-RGB onto the TV picture which yo u are seeing in full size on the screen. The TV picture can be inserted as a monitor picture, too.

Press PIP button ; switches PIP mode on/off

You can change the source of Sub-picture

You can change the size of sub-picture



You can move the sub-picture position to left/ bottom to left/top to right/ top to right/bottom

You can freeze the sub picture

You can also remove the frame of sub-picture by pressing red framed teletext button.

CIRCUIT DESCRIPTIONS

1. MICROCONTROLLER SDA 20563

1.1. SIESTA-MB Overview

SIESTA-MB TV tuning and control system is based on the SDA 20563 microcontroller. The systems offer a very comfortable teletext, on screen display (OSD), picture in picture (PIP) and IR remote control of all functions. Further the SIESTA-MB system is able to control the stereo sound device TDA 6612, the video processor TDA 4680 and a single chip NICAM solution.

As additional ICs are used:

Nonvolatile memory	SDA 2546 SDA 2586
Stereo sound control	TDA 6610/6612
PLL	SDA 3202-3 SDA 3302
Teletext decoder	SDA 5248
Data slicer	SDA 5231-2
(PIP PLL	SDA 9086)
ADIIP	SDA 9087 or SDA 9187-2
PIP	SDA 9088 or SDA 9188-3
IR transmitter	KS 51800
IR preamplifier	SFH 505A or SFH 506-38
Video processor	TDA 4680
NICAM processor	TB 1204N/F SAA 7280

1.2. SALIENT FEATURES

General:

- Display of program number, channel number, tv standard, station label, analog values, space sound, stereo sound, dual sound, quasi-stereo and mute is done by OSD (On Screen Display).

- Single LED's for IR active and stereo (tone 1, tone 2) indication.
- Local control
- IR remote control
- Control of contrast, brightness and saturation by I^2C-Bus (TDA 4680) or analog voltages (programable)
- Nonvolatile memory for 100 programs, station label, optimum analog values and system parameters.
- Individual colour or volume level for each program
- Control line for AV (programs 0, 49, AV1 AV2, RGB, SVHS)
- Control lines for 4 external sources
- Control lines for tv standard selection
- Automatic switch-off when carrier disappears for more than 5 minutes
- Software protection against tube flashovers with internal watchdog timer
- Sleep timer (30, 60, 90, 120 min.)
  Parental Control (MB only)

TUNING:

- Frequency synthesis tuning (62.5 kHz steps)
- 192 step fine tuning
- Channels corresponding to standards B/G, OIRT, L and I (I+)
- 100 programs selectable by directly entering a program number or by up/down function depending on the NVM size.
- Channel selection by directly entering a channel number or by up/down function
- Channel search function in two directions
- Automatic program storage function
- Program exchange function

Sound:

- Mono sound control by analog voltage
- Stereo sound control by I^2C-Bus (TDA 6610/11/12)
- Headphone-Control (optional)
- NICAM control (optional)

Teletext:

NORMAL	TEXT	8 Page Memory
FAST	TEXT	16 Page Memory
TOP	TEXT	32 Page Memory

Service mode:

- System configuration with service mode
- Automatic white balance
- TDA 4680 service

Picture in Picture

1.3. LOCAL CONTROL

The local control keyboard of the system involves 8 or 4 possible keys. Each key is scanned by the microcontroller with a 7 Hz scan rate, so the maximum repeat rate of commands is 7/s. If more than one key is pressed, the system will give no response.

1.4 KEY ASSIGNMENT

The microcontroller uses one row with eight columns each, for scanning the local control keyboard. The relationship between key numbers and key functions is given as follows;

key no.	function
0	down (cursor ↓)
1	up (cursor ↑)
2	tuning/finetuning
3	scart
4	analog select
5	store
6	analog + (cursor →)
7	analog – (cursor ←)

LOCAL CONTROL KEY FUNCTIONS

Although the control system was designed especially for remote control usage, basic TV operation is possible even if only the local control keyboard is used.

In the following a description of the normal function of all local control keys is given.

UP, DOWN

The UP/Down keys are used to select the program number, channel type, channel number, tv standard and station label.

TUNING/FINETUNING

The first keystroke switches the system to tuning mode, the tuning menu appears at the top of the screen. In the TUNING menu the user may select: program number, channel type, channel number, tv standard and the station label.

Additionally the features automatic program storage and program exchange are started from tuning menu. With a further keystroke the tuning menu disappears and the finetuning bargraph is displayed at the bottom of the screen. Finetuning is now possible with the ANALOG +/– keys.

The next keystroke of the TUNING/FINETUNG key switches the system back to normal mode, and display on screen is cleared.

SCART

Pressing this key switches sequential to the different scart sources (up to 4, depends on the system configuration).

AV1, AV2, S-VHS, AV1-RGB

ANALOG SELECT

This key is used to preselect an analog function (ring counter).

STORE

Pressing this key stores the actual tuning values as well station label, and analog values (normal values) in the nonvolatile memory. The adjusted value for saturation will stored as individual saturation for the selected program number as well as default saturation value.
Store will be acknowledged by the status display.

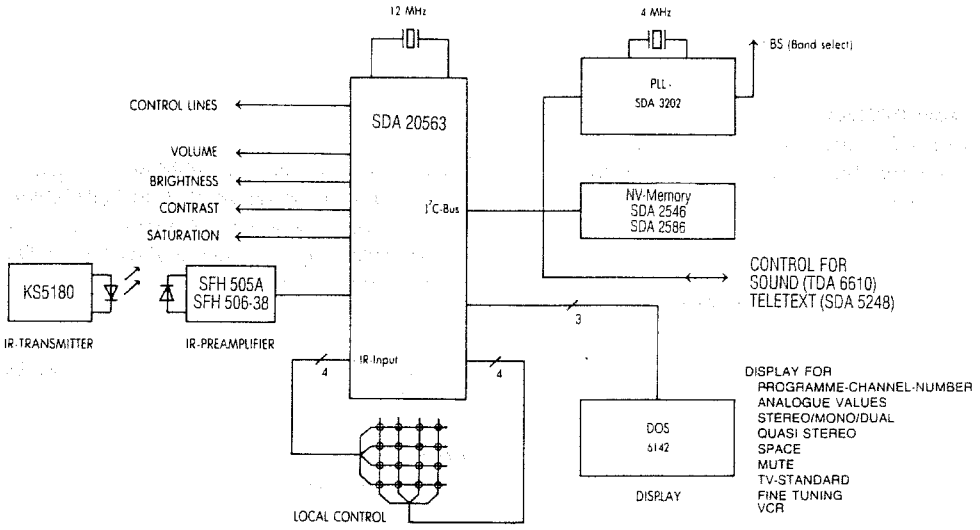
ANALOG +/- CURSOR LEFT/RIGHT

This keys increase rsp. decrease the preselected analog value. Without preselection volume is affected.

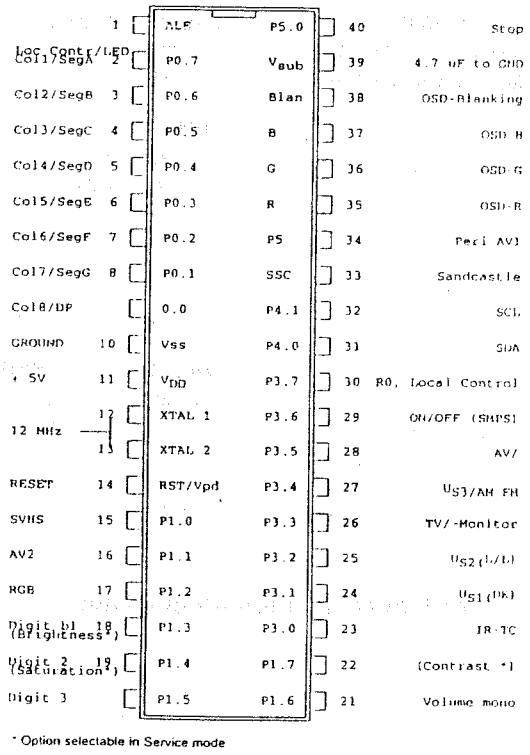
During tuning mode (tuning menu is displayed on screen) the keys are used as cursor keys.

DIFFERENCES OF MICROPROCESSOR VERSIONS

	SDA-20563-A508	SDA-20563-A512	SDA-20563-A516	SDA-20563-A514
VOLUME LEVEL MEMORY	COOMMON FOR ALL PROGRAMS	INDIVIDUAL FOR ALL PROGRAMS	INDIVIDUAL FOR ALL PROGRAMS	INDIVIDUAL FOR ALL PROGRAMS
COLOUR SAT LEVEL MEMORY	INDIVIDUAL FOR ALL PROGRAMS	COOMMON FOR ALL PROGRAMS	COOMMON FOR ALL PROGRAMS	COOMMON FOR ALL PROGRAMS
FORCED MONO	NOT AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE
STEREO IDENTIFICATION TIME	2 SECOND	4 SECOND	4 SECOND	4 SECOND
FLASHOVER PROTECTION	NOT AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE
FINE TUNING IN MENU	NOT AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE
R/C HAND SET	WITH FINE TUNING FUNCTION	WITHOUT FINE TUNING FUNCTION	WITHOUT FINE TUNING FUNCTION	WITHOUT FINE TUNING FUNCTION
FINE TUNING	ON R/C HAND SET	IN MENU	IN MENU	IN MENU
VOLUME LEVEL CONTROL	LOGARITHMIC	LINEAR	LINEAR	LINEAR
OSD AT MIN BRIGHT&CONT	NOT VISIBLE	VISIBLE	VISIBLE	VISIBLE
AUTO SEARCH PROGRAM	00-99	49-99	49-99	00-99
EARPHONE SELECTION	VISIBLE AS OSD AT AV MODE	SELECT ABLE AT SERVICE MODE	SELECT ABLE AT SERVICE MODE	SELECT ABLE AT SERVICE MODE
CANCELING THE CHILD LOCK	WITH UP/DOWN BUTTONS	WITH +/- BUTTONS	WITH +/- BUTTONS	WITH +/- BUTTONS
TINT CONTROL	NOT VISIBLE	AVAILABLE	AVAILABLE	AVAILABLE
STAND - BY AFTER MAINS INTERRUPTION	NO	YES	YES	YES

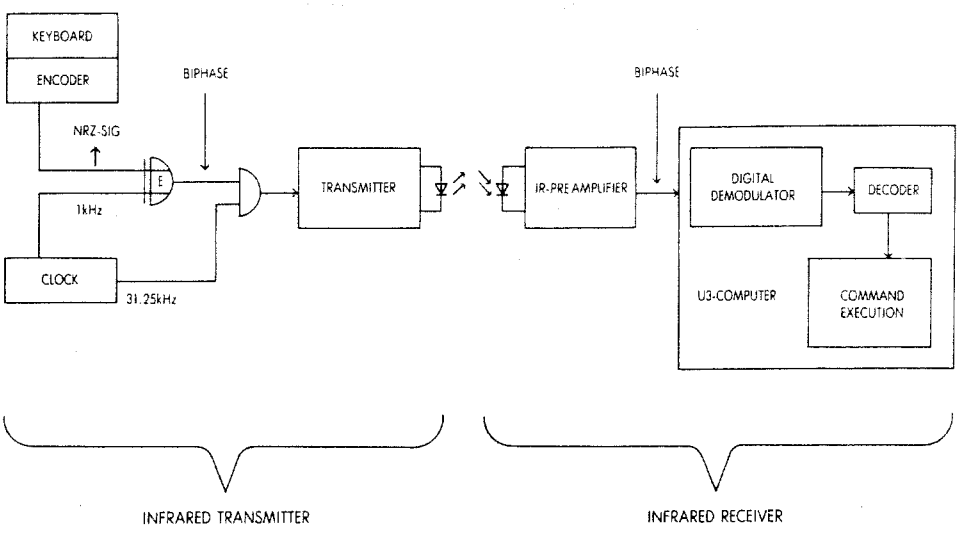


SYSTEM BLOCK DIAGRAM

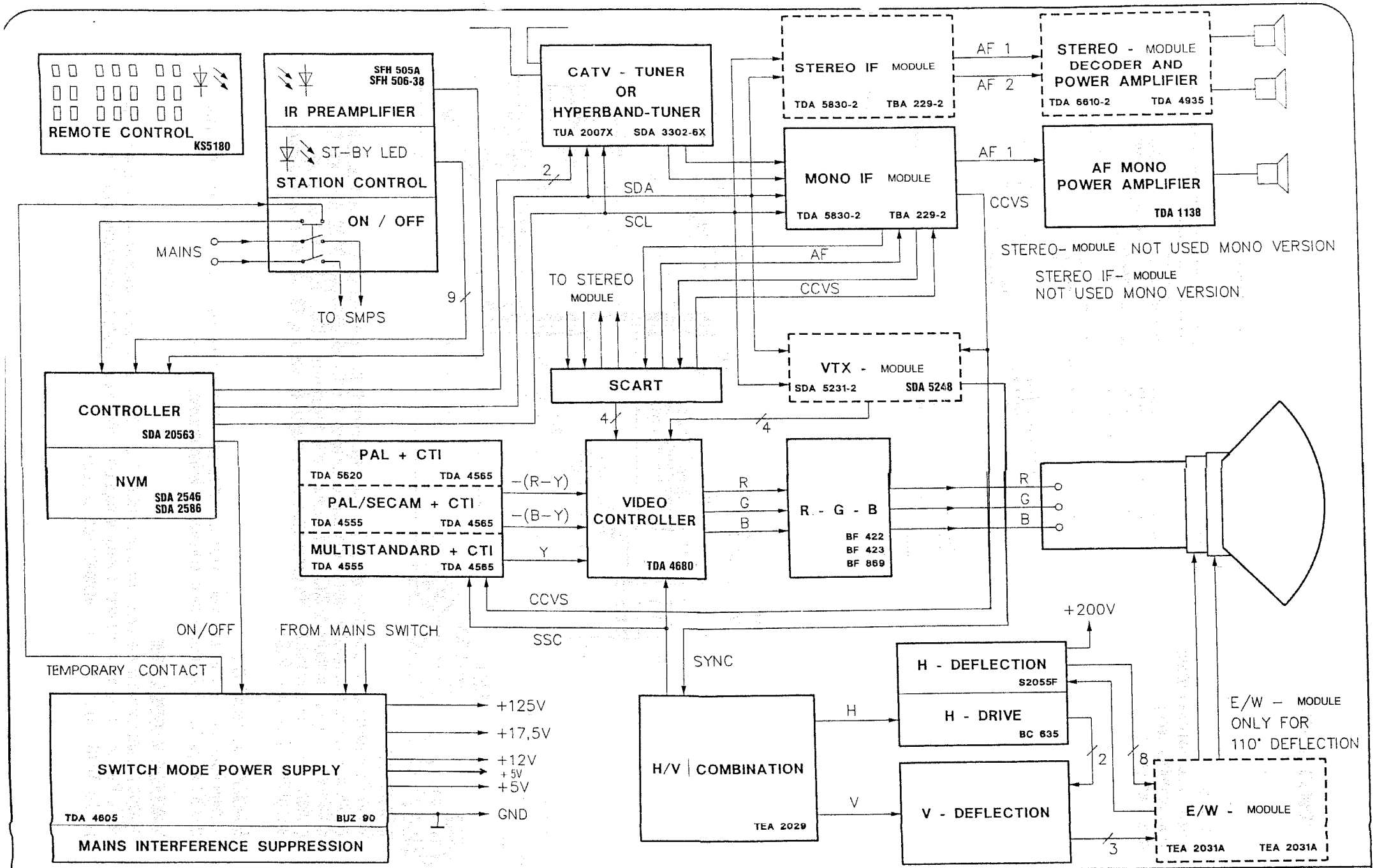

1 ALE P5.0 40 Stop
Loc Contr/LED
Col1/SegA 2 P0.7 V_Sub 39 4.7 uF to GND
Col2/SegB 3 P0.6 Blan 38 OSD-Blanking
Col3/SegC 4 P0.5 B 37 OSD-B
Col4/SegD 5 P0.4 G 36 OSD-G
Col5/SegE 6 P0.3 R 35 OSD-R
Col6/SegF 7 P0.2 P5 34 Peri AV1
Col7/SegG 8 P0.1 SSC 33 Sandcastle
Col8/DP P0.0 P4.1 32 SCL
GROUND 10 Vss P4.0 31 SDA
+ 5V 11 V_DD P3.7 30 R0, Local Control
12 MHz 12 XTAL 1 P3.6 29 ON/OFF (SMPS)
13 XTAL 2 P3.5 28 AV/
RESET 14 RST/Vpd P3.4 27 U_S3/AH FN
SVHS 15 P1.0 P3.3 26 TV/-Monitor
AV2 16 P1.1 P3.2 25 U_S2(L/L)
RGB 17 P1.2 P3.1 24 U_S1(DK)
Digit bl 18 (Brightness*) P1.3 P3.0 23 IR-TC
Digit 2 19 (Saturation*) P1.4 P1.7 22 (Contrast *)
Digit 3 P1.5 P1.6 21 Volume mono

* Option selectable in Service mode

MICROCONTROLLER PIN CONFIGURATION



IR REMOTE CONTROL BLOCK DIAGRAM

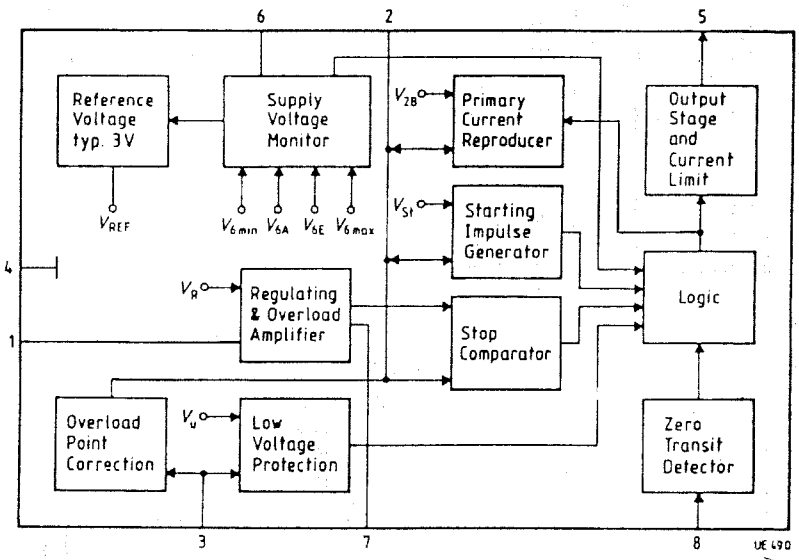


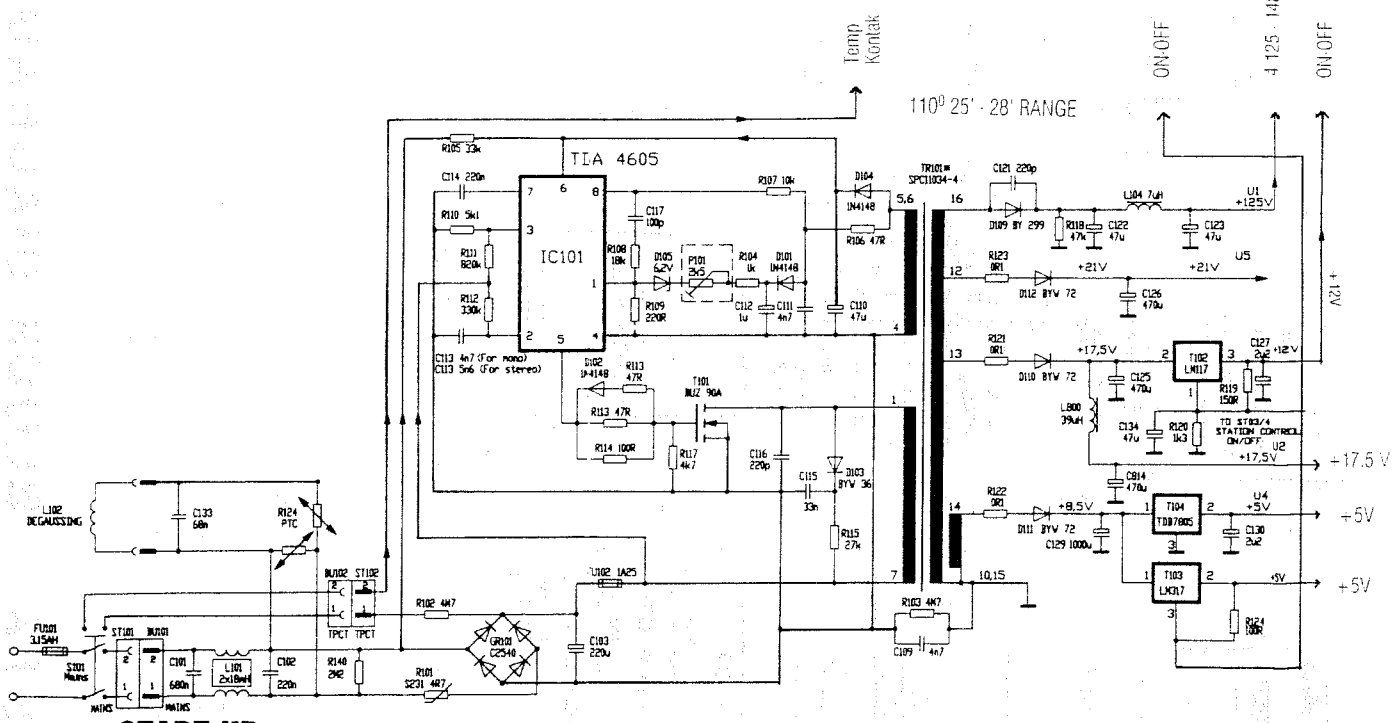
Bekoteknik SIESTA BLOCK DIAGRAM

POWER SUPPLY

TDA 4605
Control IC for Switched-Mode Power Supplies using MOS Transistors

Block Diagram





START UP

When TV is switched ON a start voltage (9V) is generated over R105 at pin 6 of IC 101, TDA4605. IC101 produces a 50 kHz squarewave, whic is supplied to the base of T101, BUZ90A over D102, R113 and R114. Collector of T101 is connected to 330 V with switch mode transformer TR101. 330 V is chopped at primary side of the transformer. This generates varios voltages at pins 5, 6, 13, 14, 16 of the secondary side of the transformer TR101.

NORMAL OPERATION

Voltage from pin 5, 6 of transformer TR101 is reftified with D104 and applied to pin 6 of IC101. When this stable voltage 12 V DC reaches pin 6, start voltage is interrupted.

VOLTAGE REGULATION

Voltage obtained from D104 goes over D101, R104, P101, D105 6.2V zener diode to pin 1 of IC101, TDA 4605. This circuit regulates the main supply voltage U1 125V. Pin 8 of IC101 is connected over R107 to pin 8 of TR101, which performs automatic voltage control.

IR TRANSMITTER KS5180

DESCRIPTION

KS51800, a 4-bit single-chip CMOS microcontroller, conssits of the reliable SMCS-51 CPU core with on-chip ROM and RAM. Eight input pins and 11 output pins provide the flexibility for various I/O requirements. The KS51800 microcontroller has been designed for use in small system control applications that require a low-power, cost-sensitive design solution. In addition, the KS51800 has been optimized for remote control transmitter.

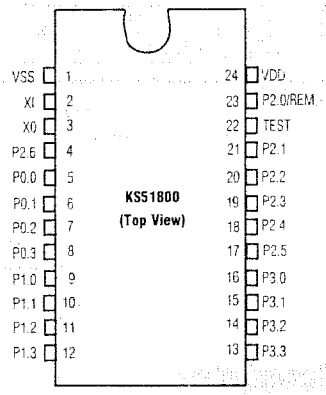
FEATURES

- ROM Size ..... 1,024 bytes
- RAM Size ..... 32 nibbles
- Instruction Set ..... 39 instructions
- Instruction Cycle Time ..... 13.2 μsec at 455 kHz
- Input Ports ..... Two 4-bit ports (Po,P1)
- Output Ports ..... One 4-bit port (P3), One 7-bit port (P2)
- Buit-in Oscillator ..... Crystal/Ceramic resonator
- Buit-in Power-on reset and auto reset circuit for generating reset pulse every 131,072/Fosc (288 ms at 455 KHz)
- Four Transmission Frequencies ..... Fosc/12 (1/4 duty), Fosc/12 (1/3 duty), Fosc/8 (1/2 duty) and no-carrier frequency.
- Supply Voltage ..... 2.2 V - 5.5 V
- Power Consumption ..... Halt mode: 1 μA (maximum)
  Normal mode: 0.34 mA (typical) at 700 KHz
- Operating temperature ..... $-20^{0}C - 85^{0}C$
- Package Type ..... 24 DIP-SK, 24 SOP

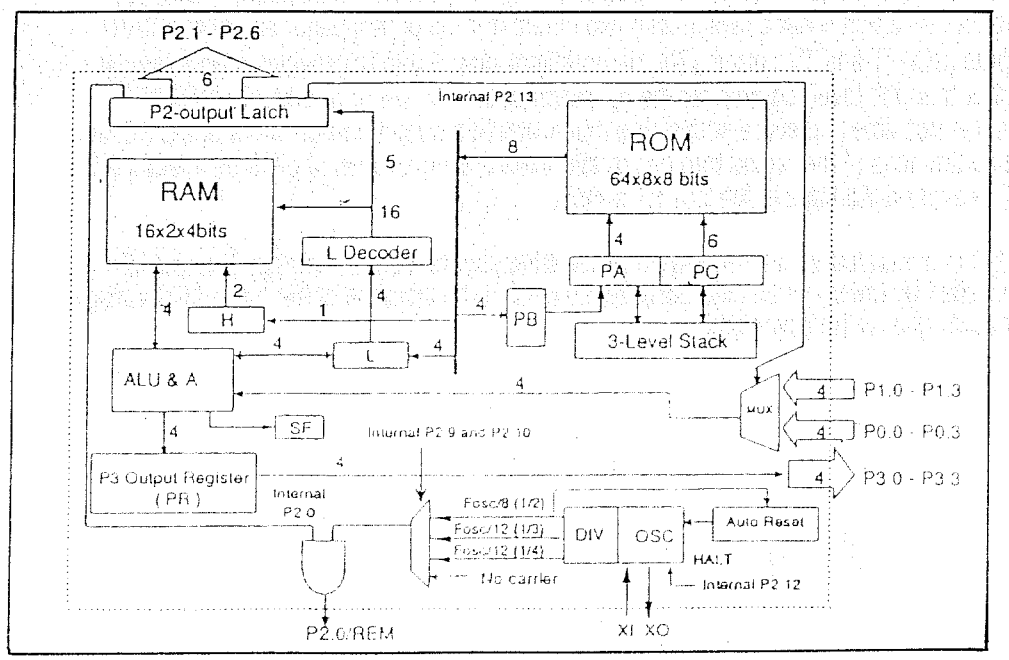
PIN DESCRIPTION

Symbols	Pin No.	Type	Functions	I / O Circuit Type
P0.0 – P0.3	5,6,7,8	Input	4-bit input port when P2.13 is low	A
P1.0 – P1.3	9,10,11,12	Input	4-bit input port when P2.13 is high	A
P2.0/REM	23	Output	1-bit individual output for remote carrier frequency *	B
P2.1 – P2.6	21,20,19,18 17,4	Output	1-bit individual output port	C
P3.0 – P3.3	16,15,14,13	Output	4-bit parallel output port	C
TEST	22	Input	Input pin for test (Normally connected to VSS)	
XI	2	Input	Oscillation clock input	
XO	3	Output	Oscillation clock output	
VDD	24		Power supply	
VSS	1		Ground	

Note: Package type can be selected as 24 DIP-SK or 24 SOP

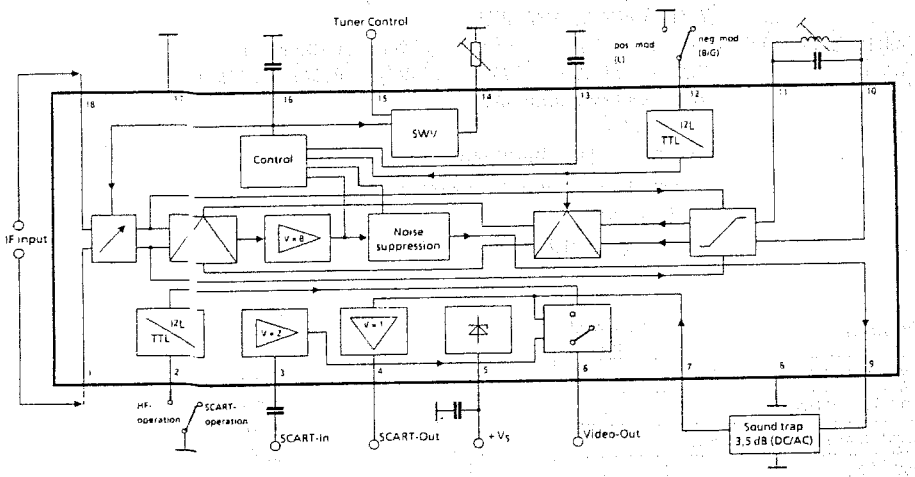


Block Diagram



TDA 5931- 6 VIDEO-IF AMPLIFIER AND DEMODULATOR WITH FULLSCART

Block Diagram



Pin Functions

1 Video IF input
2 SCART Switch A / W
3 SCART input
4 SCART Input Output
5 Supply voltage
6 Positive video output
7 Video output of the sound trap (2 Vpp)
8 Ground
9 Video input of the sound trap (3 Vpp)
10 Demodulator tank circuit
11 Demodulator tank circuit
12 TV standart switch-over (B/G) - (L)
13 Low-pass filter (averaging)
14 Tuner AGC threshold
15 Tuner AGC output
16 AGC time constant
17 Ground
18 Video IF input

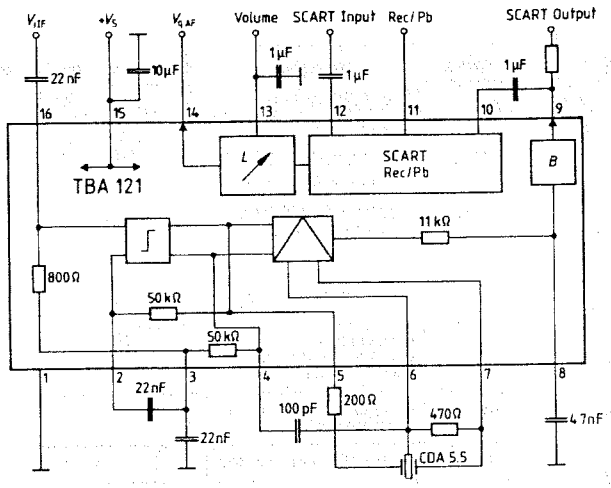
Circuit Description

The component includes a four-stage, capacitatively coupled, symmetrically designed and controlled amplifier a limiter with selection, and a mixer for quasi-synchronous demodulation of positive and negative modulated IF signals. In addition a video output amplifier and noise suppression circuitry are included. This output is used for generating the AGC voltage. The AGC for both modulation types has been realized as integral AGC with noise free peak and mean value detector (only for positive modulation). For SCART applications this output is switched a video switch with two inputs (for the demodulator signal or SCART socket) and two outputs (SCART-and TV output). The demodulator output (pin 9) provides a video signal output level 3 dB higher than the level required for the operation of the TV set or to drive the SCART connector. Therefore it is possible to insert a sound trap inbetween this output and the input of the SCART switch (pin 7). The insertion loss of the sound trap has to attenuate the signal level at pin 9 by a factor 2/3 or 3 dB (AC and DC) to avoid distortions in the SCART switch.

The delayed tuner AGC is generated by a threshold amplifier driven by the control voltage. The amplifier response can be controlled by means of an external potentiometer. (The increase of the tuner AGC voltage shall create a higher tuner gain = positive control)

TBA 121 FM Sound IF with SCART Switch and Volume Control

Blok Diagram



Features

- Outstanding limiting qualities
- Few external components
- Integrated deemphasis resistor
- Low harmonic distorsion factor

PIN FUCTIONS

Pin No.	Function
1.	Ground
2.	Limiter amplifier operating point feedback
3.	Limiter amplifier operating point feedback and low end
4.	IF amplifier output (emitter follower)
5.	IF amplifier output (emitter follower)
6.	Demodulator input with high impedance input and internal 15 kΩ supply resistor
7.	Demodulator input with high impedance input and internal 15 kΩ supply resistor
8.	Connection for demphasis capacitor
9.	AF output of the SCART interface
10.	AF input 1 of the SCART interface (IF branch)
11.	Rec/Pb switch input
12.	AF input 2 of the SCART interface (SCART input)
13.	Volume control
14.	IF output (emitter follower)
15.	Supply voltage
16.	IF input

In its FM section the device incorporates an eight,stage-balanced limiter amplifier followed by a coincidence demodulator. The AF section includes an analog switch for the SCART record/playbac function and an analog volume control with AF output..

TDA4680 Video Processor with automatic cut-off and white level control

FEATURES

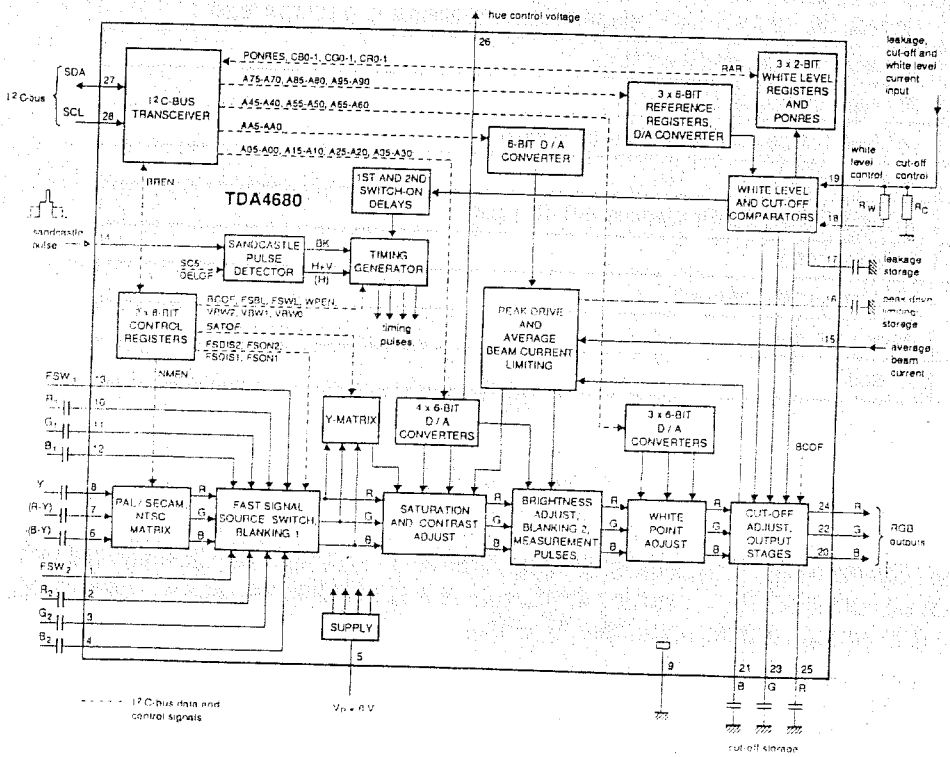
- Operates from an 8 V DC supply
- Black level clamping of the colour-difference, luminance and RGB input signals with coupling-capacitor DC level storage
- Two fully-controlled, analog RGB inputs, selected either by fast switch signals or via I^2C-bus
- Saturation, contrast and brightness adjustment via I^2C-bus
- Same RGB output black levels for Y/CD and RGB input signals
- Timing pulse generation from either a 2- or 3-level sandcastle pulse for clamping, horizontal and vertical synchronization, cut-off and white level timing pulses
- Automatic cut-off control with picture tube leakage current compensation
- Software-based automatic white level control or fixed white levels via I^2C-bus
- Cut-off and white level measurement pulses in the last 4 lines of the vertical blanking interval (I^2C bus selection for PAL, SECAM, or NTSC, PAL-M)
- Increased RGB signal bandwidths for progressive scan and 100 Hz operation (selected via I^2C bus)
- Two switch-on delays to prevent discolouration before steady-state operation
- Average beam current and peak drive limiting

DESCRIPTION

The TDA4680 is a monolithic, integrated circuit with a colour-difference interface for video processing in TV receivers.

SYMBOL	PARAMETER	MIN	TYP.	MAX.	UNIT
V_D	supply voltage range (pin 5)	7.2	8	8.8	V
I_D	supply current (pin 5)	–	85	–	mA
V_Y (p-p)	luminance input (peak-to-peak value)	–	0.45	–	V
V_{B-Y} (p-p)	(B-Y) input (peak-to-peak value)	–	1.33	–	V
V_{R-Y} (p-p)	(R-Y) input (peak-to-peak value)	–	1.05	–	V
V14	three level sandcastle pulse: H+V H BK	– – –	2.5 4.5 8	– – –	V V V
	two level sandcastle pulse: H+V BK	– –	2.5 4.5	– –	V V
V_I	RGB input signals at pins 2, 3, 4, 10, 11 and 12 (black-to-white value)	–	0.7	–	V
V_O (p-p)	RGB outputs at pins 24, 22 and 20 (peak-to-peak value)	–	2.0	–	V
T_{amb}	operating ambient temperature range	0	–	–	0

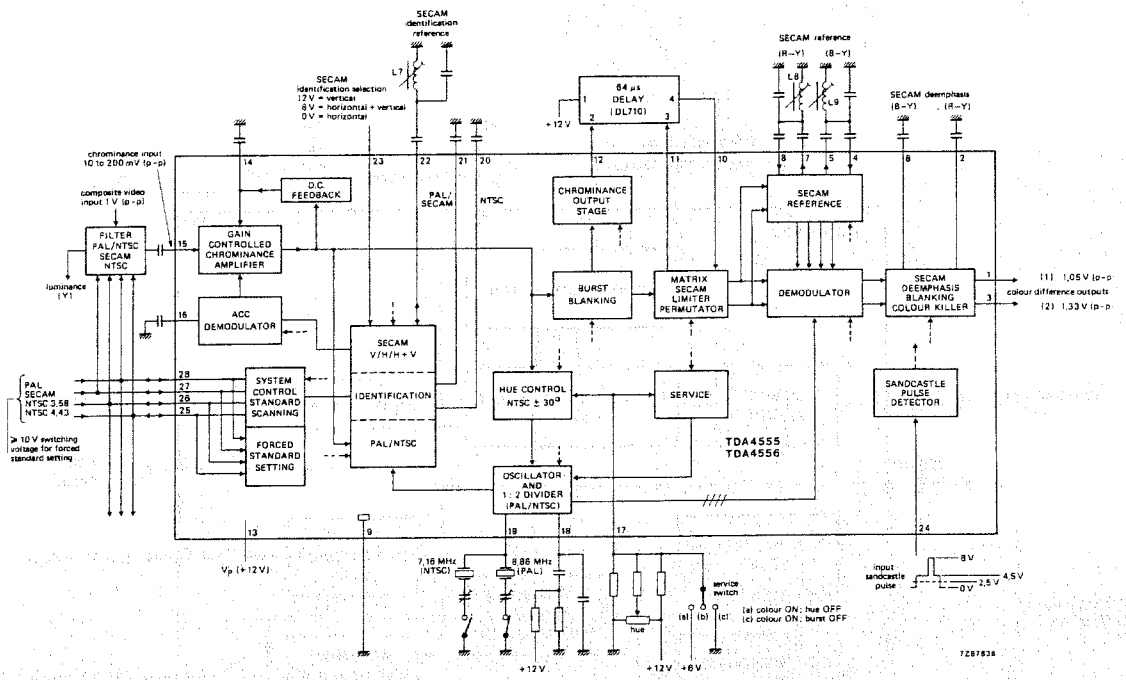
Blok Diagram



TDA 4555 MULTISTANDART DECODER

The TDA4555 is a monolithic integrated multistandard colour decoder for PAL, SECAM, NTSC 3.58 MHz and NTSC 4.43 MHz standard.

Blok Diagram



FEATURES

Chrominance part includes gain controlled chrominance amplifier and ACC rectifier circuits for PAL, SECAM and NTSC. Chrominance output stage drives the 64 µs glass delay line (Pal, Secam). There are SECAM permutater and limited stages for direct and delayed SECAM SIGNAL.

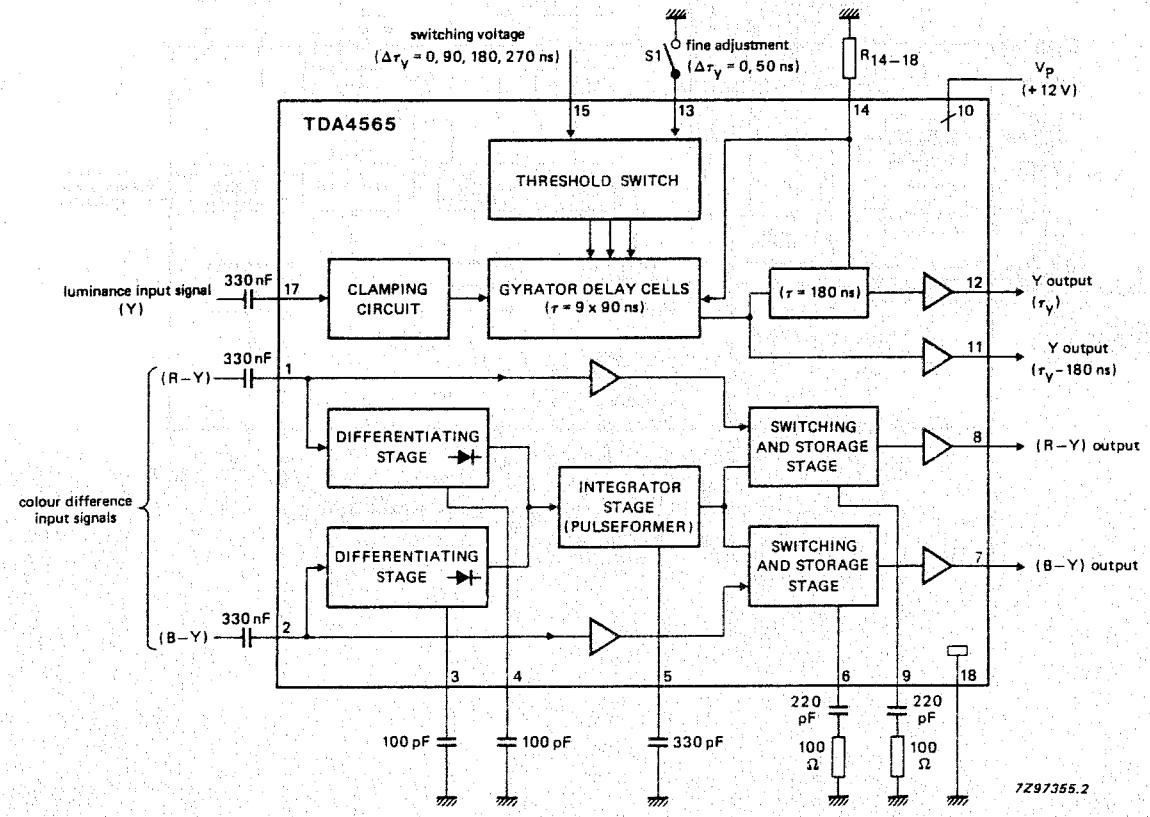
Demodulator part PAL switch, internal PAL matrix, de-emphasis, two quadrate demodulators with external reference tuned circuits (SECAM). Flyback blanking incorporated in the two synchonous demodulators (PAL, NTSC), and residual carrier is filtered internaly.

Identification part performs automatic standard recognition by sequential inquiry, delay for colour-on and scanning-on. SECAM identification is reliable by PAL priority circuit. Forced switch-on is possible I C includes two identification circuit for PAL/SECAM (H/2) and NTSC and PAL/SECAM flip-flop. Crystal oscillator includes divider stages and PLL circuity (PAL, NTSC) for double colour subcarrier frequency

TDA 4565 COLOUR TRANSIENT IMPROVEMENT CIRCUIT

GENERAL DESCRIPTION

The TDA 4565 is a monolithic integrated circuit for coulour transient improvement (CTI) and luminance delay line in gyrator technique in colour television receivers.



Features

- Colour transient improvement for colour difference signals (R-Y) and (B-Y) with transient detecting, store- and switching stages resulting in high transients of colour difference output signals.

- A luminance -signal path (Y) which substitutes the conventional Y-delay coil with an integrated Y-delay line.

- Switchable delay time from 730 ns to 1000 ns in steps of 90 ns and additional fine adjustment of 50 ns

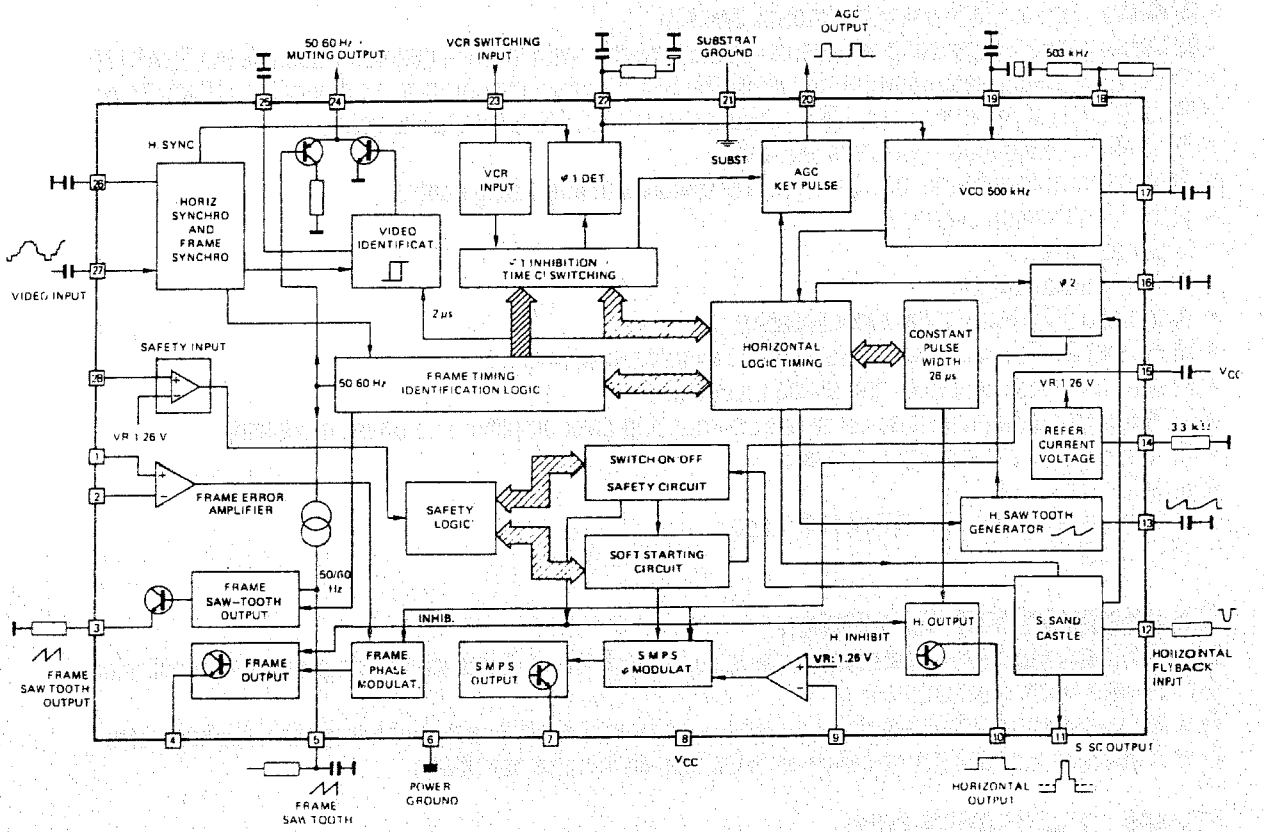
- Two Y output signals; one of 180 ns less delay

TEA2029 C COLOUR TV SCANNING AND POWER SUPPLY PROCESSOR

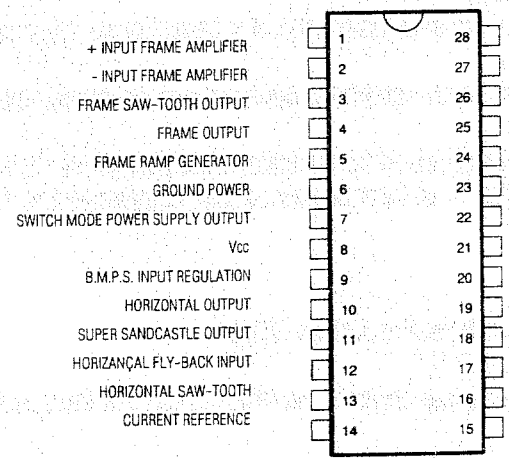
DESCRIPTION

The TEA2029 is a complete (horizontal and vertical) deflection processor with secondary to primary SMPS control for color TV sets.

BLOCK DIAGRAM



PIN CONNECTIONS



+ INPUT FRAME AMPLIFIER	1	SAFETY INPUT
- INPUT FRAME AMPLIFIER	2	VIDEO INPUT
FRAME SAW-TOOTH OUTPUT	3	HORIZONTAL SYNCHRO CAPACITOR (tip level)
FRAME OUTPUT	4	VIDEO IDENTIFICATION CAPACITOR
FRAME RAMP GENERATOR	5	MUTING +50/60Hz IDENTIFICATION OUTPUT
GROUND POWER	6	V.C.R. INPUT
SWITCH MODE POWER SUPPLY OUTPUT	7	PHASE COMPARATOR ø 1 CAPACITOR
Vcc	8	GROUND SUBSTRAT
B.M.P.S. INPUT REGULATION	9	A.G.C. KEY PULSE OUTPUT
HORIZONTAL OUTPUT	10	V.C.O. INPUT
SUPER SANDCASTLE OUTPUT	11	V.C.O. OUTPUT
HORIZANÇAL FLY-BACK INPUT	12	V.C.O. 90° REFERENCE
HORIZONTAL SAW-TOOTH	13	PHASE COMPARATOR ø2 CAPACITOR
CURRENT REFERENCE	14	STARTING AND SAFETY CAPACITOR

GENERAL DESCRIPTION

This integrated circuit uses I^2L bipolar technology and combines analog signal processing with digital processing.
Timing signals are obtained from a voltage-controlled oscillator (VCO) operating at 500KHz by means of a ceramic resonator. This avoids the frequency adjustment normally required with line and frame oscillators.
A chain of dividers and appropriate logic circuitry produce very accurately defined sampling pulses and the necessary timing signals.
The principal functions implemented are:

- Horizontal scanning processor.
- Frame scanning processor. Two applications are possible:

- D Class Power stage using an external thyristor.
- B Class Power stage using an external power amplifier with fly-back generator such as the TDA8170

- Secondary switch mode power regulation. The SMPS output synchronize a primary I.C. (TEA2164 or TEA2260/61) at the mains part. This concept allows ACTIVE STANDBY facilities.
- Dual phase-locked loop horizontal scanning.
- High performance frame and line synchronization with interlacing control.
- Video identification circuit.
- Super sandcastle.
- AGC key pulse output..
- Automatic 50-60Hz standard identification.
- VCR input for PLL time constant and frame synchro switching.
- Frame saw-tooth generator and phase modulator.
- Switching mode regulated power supply, comprising error amplifier and phase modulator.
- Security circuit and start-up processor.
- 500KHz VCO.

The circuit is supplied in a 28 pin DIP case.
Vcc = 12V.

SYNCHRONIZATION SEPARATOR

Line synchronization separator is clamped to black level of input video signal with synchronization pulse bottom level measurement.
The synchronization pulses are divided centrally between the black level and the synchronization pulse bottom level, to improve performance on video signals in noise conditions.

FRAME SYNCHRONIZATION

Frame synchronization is fully integrated (no external capacitor required).
The frame timing identification logic permits automatic adaptation to 50 - 60 Hz standard or non-interlaced video.
An automatic synchronization window width system provides:

- fast frame capture (6.7 ms wide window).
- good noise immunity (0.4ms narrow window).

The internal generator starts the discharge of the saw-tooth generator capacitor so that it is not disturbed by line fly back effects.
Thanks to the logic control, the beginning of the charge phase does not depend on any disturbing effect of the line fly-back.
A 32µs timing is automatically applied on standardized transmissions, for perfect interlacing.
In VCR mode, the discharge time is controlled by an internal monostable independent of the line frequency and gives a direct frame synchronization.

HORIZONTAL SCANNING

The horizontal scanning frequency is obtained from the 500kHz VCO.
The circuit uses two phase-locked loops (PLL):
the first one controls the frequency, the second one controls the relative phase of the synchronization and line fly-back signals.

The frequency PLL has two switched time constants to provide:
- capture with a short time constant.
- good noise immunity after capture with a long time constant.

The output pulse has a constant duration of 26µs, independent of Vcc and any delay in switching off the scanning transistor.

VIDEO IDENTIFICATION

The horizontal synchronization signal is sampled by a 2µs pulse within the synchronization pulse. The signal is integrated by an external capacitor.
The identification function provides three different levels:
- 0V : no video identification
- 6V : 60Hz video identification
- 12V : 50Hz video identification

This information may be used for timing research in the case of frequency or voltage synthetizer type receivers, and for audio muting.

SUPER SANDCASTLE with 3 levels : burst, line flyback, frame blanking.
In the event of vertical scanning failure, the frame blanking level goes high to protect the tube.
Frame blanking time (start with reset of Frame divider) is 24 lines.

VCR INPUT

This provides for continuos use of the short time constant of the first phase-locked loop (frequency).
In VCR mode, the frame synchronization window widens out to search window and there is no delay of frame fly-back (direct synchronization).

FRAME SCANNING

FRAME SAW-TOOTH GENERATOR. The current to charge the capacitor is automatically switched to 60Hz operation to maintain constant amplitude.
Frame phase modulator (With two differential inputs). The output signal is a pulse at the line frequency, pulse width modulated by the voltage at the differential pre-amplifier input.
This signal is used to control a thyristor which provides the scanning current to the yoke. The sawtooth output is a low impedance, however, and can therefore be used in class B operation with a power amplifier circuit.

SWITCH MODE POWER SUPPLY (SMPS) SECONDARY TO PRIMARY REGULATION

This power supply uses a differential error amplifier with an internal reference voltage of 1.26 and a phase modulator operating at the line frequency. The power transistor is turned off by the falling edge of the horizontal saw-tooth.

The "soft start" device imposes a very small conduction angle on starting up, this angle progressively increases to its nominal regulation value.

The maximum conduction angle may be monitored by forcing a voltage on pin 15. This pin may also be used for current limitation.

SECURITY CIRCUIT AND START UP PROCESSOR

When the security input (pin 28) is at a voltage exceeding 1.26V the three outputs are simultaneously cut off until this voltage drops below the 1.26 V threshold again. In this case the switch mode power supply is restarted by the "soft start" system.

If this cycle is repeated three times, the three outputs are cut off definitively. To reset the safety logic circuits, Vcc must be zero volt.

This circuit eliminates the risk to switch OFF the TV receiver in the event of a flash affecting the tube.

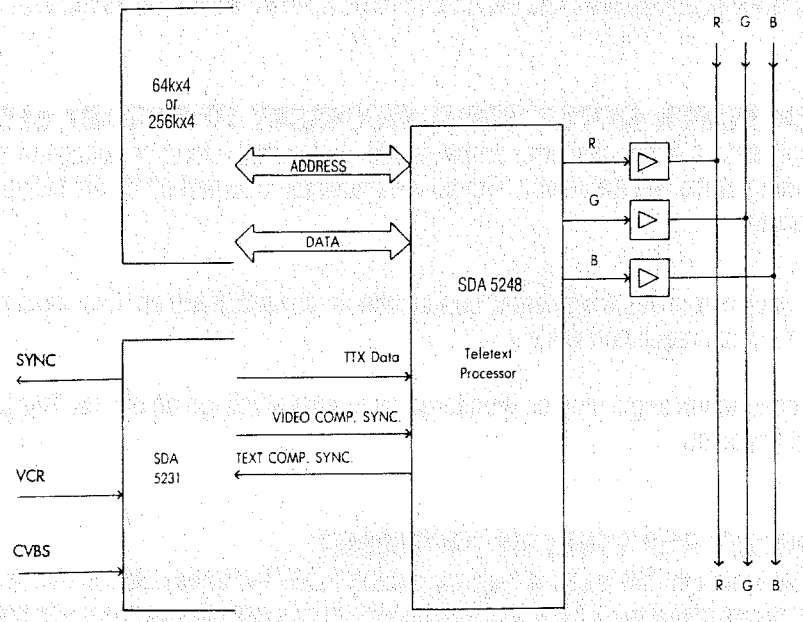
TELETEXT MODULE

1.3.5 TELETEXT DATA SLICER SDA 5231

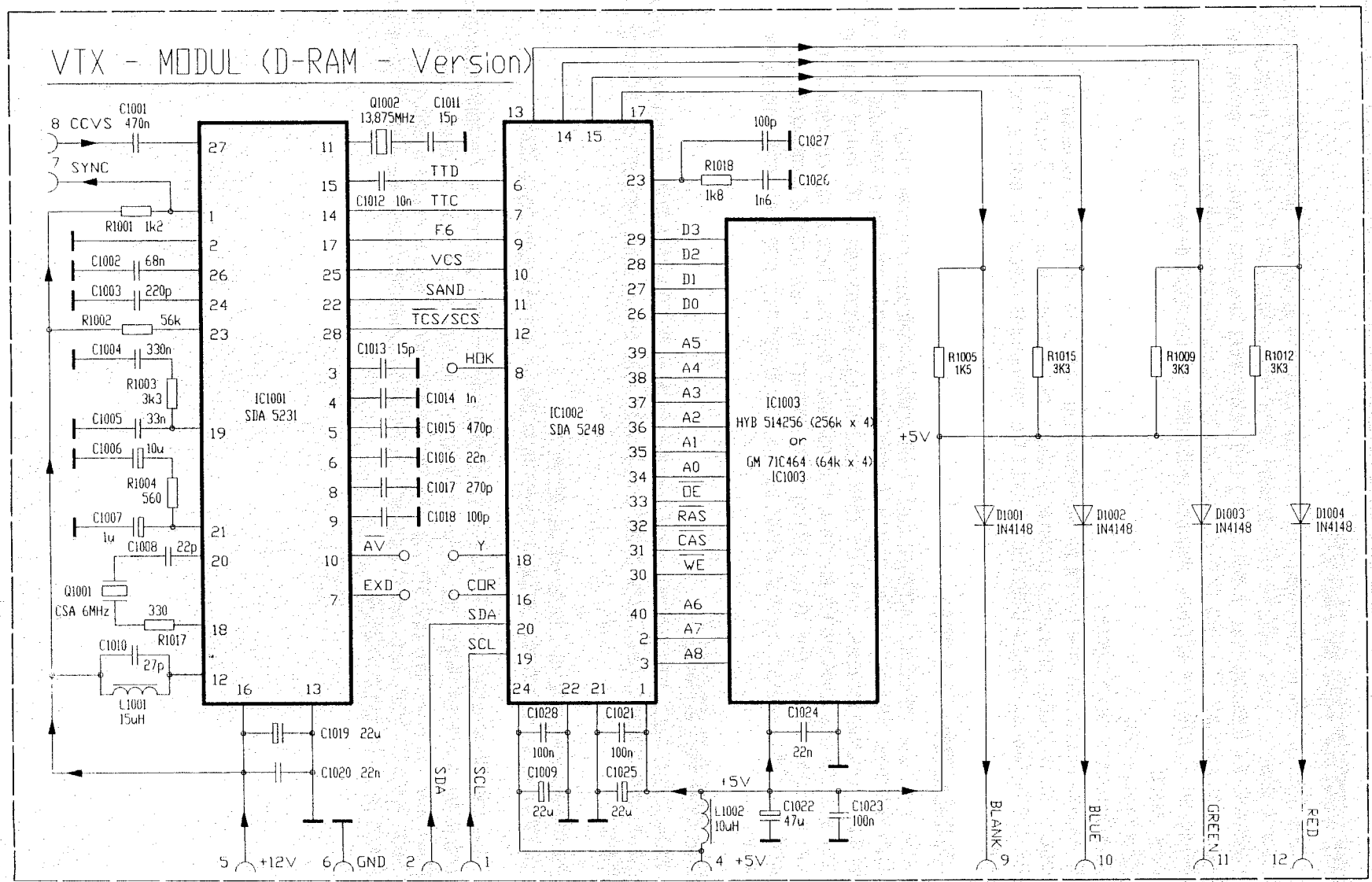
The SDA 5231 data slicer is used in the teletext decoding section to seperate the teletext data signal from the CVBS signal. Information consists of eight bits, where the most significant bit is a parity bit, followed by seven data bits. The teletext signal amplitude is reduced to 50 percent of it's incoming value by the SDA 5231 to reduce the possibility of interference from other sources. A phase shifting circuit together with a crystal oscillator regenerate the data synchronous clock. So clock and data signal can be supplied to the teletext decoder device.
A synchronous separator generates line and field sync pulses. The line sync signal is used to control an on-chip 6MHz oscillator which passes on the clock signal to the teletext decoder.
After attaing line frequency (15,625kHz), the signal is transmitted to the slicer. Here a phase comparator synchronizes the, 5.5MHz oscillator rigidly to the video signal so that, if video signal quality is sufficient, fading in a text into a TV picture (e.g.subtitles) is possible synchronous to CVBS signal. The SDA 5231 is manufactured in bipolar technology and housed in a DIP 28 case.

1.3.6 THE TELETEXT PROCESSOR SDA 5248

The teletext processor SD 5248 and IIC bus controlled devices to process all funtions which are necessary to use the teletext service of broadcasters, only in 6 foreign languages as English, German, French, Türkish, Spanish, Italien.
Serial teletext data is received from the SDA 5231 data slicer. Four independent acquisition circuits are responsible for selecting the requested data. After acquisition the data is loaded via a memory interface to an external DRAM. Using DRAM it is possible to store up to 16 pages for fastext 32 pages for toptext. The external DRAM is read out cyclically and the data is processed in a character generator into R-, G-, B-information. Further a blanking signal, a contrast reduction signal and a Y-signal to control a black and white monitor are generated. Via the IIC bus interface 12 registers can be loaded by the microcontroller and one register can be read and written too.
The SDA 5248 is mounted in a 40 pin DIP case.



TELETEXT DECODER BLOCK DIAGRAM


VTX - MODUL (D-RAM - Version)
IC1001
SDA 5231
IC1002
SDA 5248
IC1003
HYB 514256 (256k x 4)
or
GM 71C464 (64k x 4)
IC1003
8 CCVS
7 SYNC
C1001 470n
R1001 1k2
C1002 68n
C1003 220p
R1002 56k
C1004 330n
R1003 3k3
C1005 33n
C1006 10u
R1004 560
C1007 1u
C1008 22p
Q1001 CSA 6MHz
R1017 330
C1010 27p
L1001 15uH
Q1002 13,875MHz
C1011 15p
C1012 10n
TTD
TTC
F6
VCS
SAND
TCS/SCS
HOK
C1013 15p
C1014 1n
C1015 470p
C1016 22n
C1017 270p
C1018 100p
AV
EXD
Y
COR
SDA
SCL
C1019 22u
C1020 22n
C1021 100n
C1024 22n
C1025 22u
C1026 1n6
C1027 100p
R1018 1k8
C1028 100n
C1009 22u
L1002 10uH
C1022 47u
C1023 100n
R1005 1K5
R1015 3K3
R1009 3K3
R1012 3K3
+5V
D1001 1N4148
D1002 1N4148
D1003 1N4148
D1004 1N4148
BLANK
BLUE
GREEN
RED
5 +12V
6 GND
2
1
4 +5V
9
10
11
12

NICAM MODUL

BRIEF DESCRIPTION OF SAA 7280

The SAA 7280 is a CMOS integrated circuit that fully conforms to the EBU NICAM 728 specification. This device takes as input a NICAM 728 encoded signal data stream from the DQPSK demodulator, then performs the descrambling, de-interleaving and reformatting functions required to recover the original sound samples. The SAA 7280 contains an I²C bus transceiver enabling microcomputer control of the IC, and has automatic decoding and output configuration depending upon transmission:
— digital stereo
— digital mono+data
— two independent mono signals
Other features include: on board RAM for de-interleaving and 10 to 14 bit word expansion, 7 sample interpolator for erroneous samples, selectable 3x digital oversampling filter, and I²S sound bus output format. The on-chip 3x oversampling filter reduces the components needed for external analogue filtering.

D/A CONVERSION - TDA 1543

The TDA 1543 is a monolithic integrated dual 16-bit digital-to-analogue converter (DAC), which was originally developed for compact disk players. It combines ease and economy of application with good digital audio performance levels. The TDA 1543 takes in digital sound data in I²S format from the decoder and provides analogue left and right channel audio outputs. There is no requirement for external deglitcher circuitry due to fast settling output current, and few external components are required. A resistor, is used to set an output current bias to optimally bias the output operational amplifiers.

AUDIO OUTPUT STAGE

The audio output stage converts the current source outputs of theTDA 1543 DAC into an audio output voltage on connectors X2 and X3 for power amplification. The output stage performs the following two functions:

— De-emphasis according to J-17 recommendation.
— Low pass filtering to remove sampling images from the 3X oversampling digital filter.

Two dual operational amplifiers (NE 5532) are included (one for each channel) on the application board to perform the above functions. One of the amplifiers in each package is used to perform the de-emphasis and first order low pass filtering. The second amplifier is used to realise a Sallen and Key 2nd order low pass filter. The overall response is a 3rd order Chebyshev low pass filter with a ripple bandwidth of 15KHz (ripple 0.25dB).

FM-MONO I-STANDARD

TV-Transmitter-Mode	Display on Screen	Remote Control
mono		
all modes	Mono	AF-Mode (force mono)

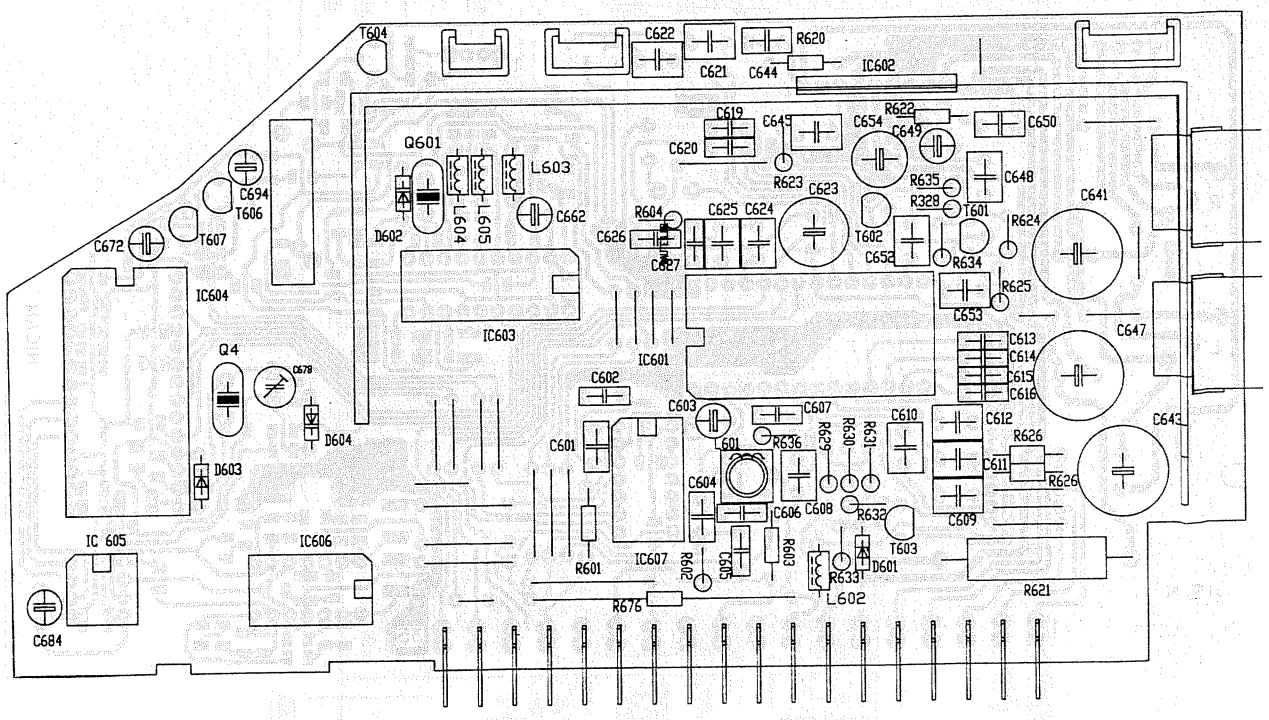
NICAM I-STANDARD

TV-Transmitter-Mode	Display on Screen	Remote Control
Mono	NICAM	
dual	NICAM Dual A NICAM Dual B	AF - Mode
stereo	NICAM Stereo	
all modes	Mono	AF - Mode (*) (force mono)

(*) In the mode force-mono the status NICAM is changing to FM-Sound and the display on screen NICAM will flash.

When the FM-Signal is not carrying the same sound program as the NICAM stereo or mono signal the display on screen is (NICAM) and the FM-Sound is priority.

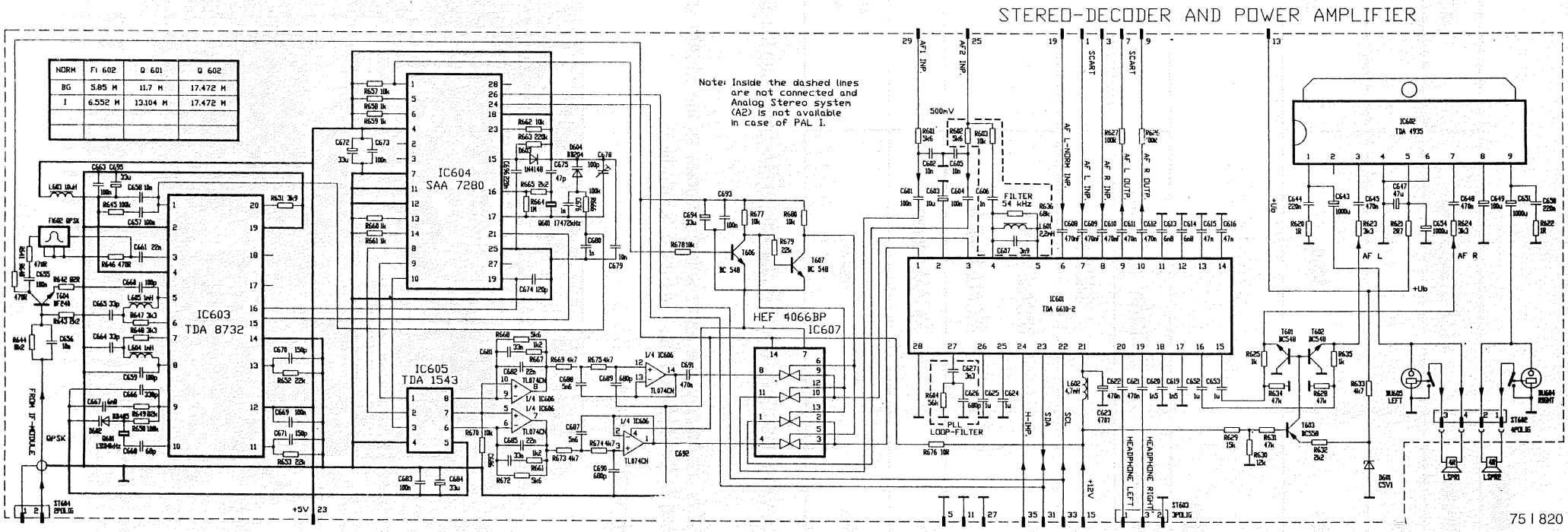
NICAM MODULE PATTERN DRAWING



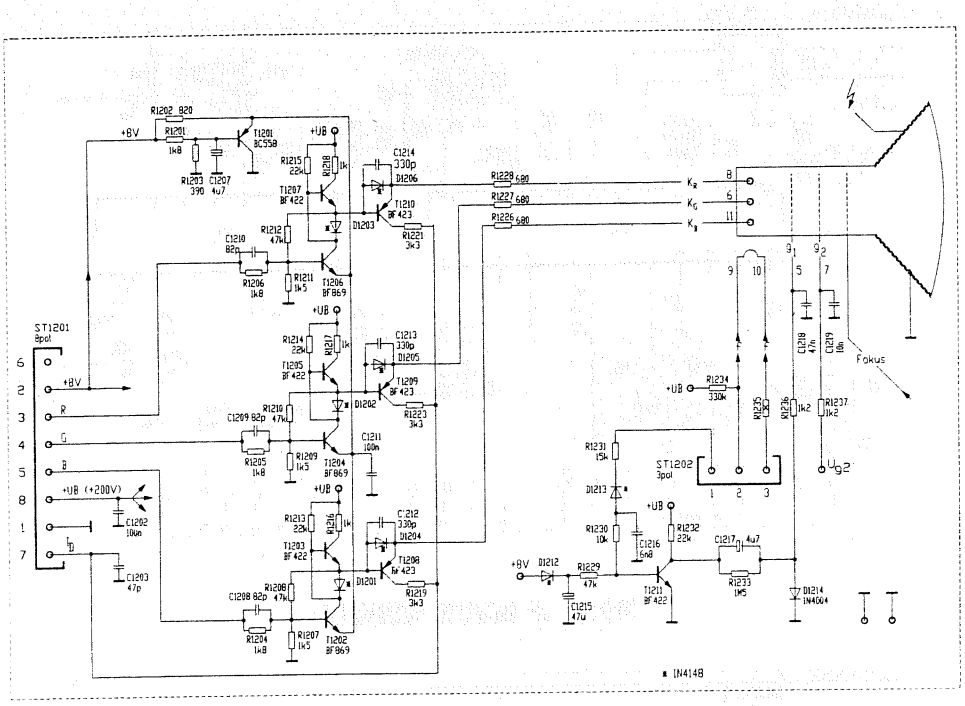
STEREO AF AND NICAM MODULE WITH POWER AMPLIFIER

(Not used when stereo AF module with Decoder is available)

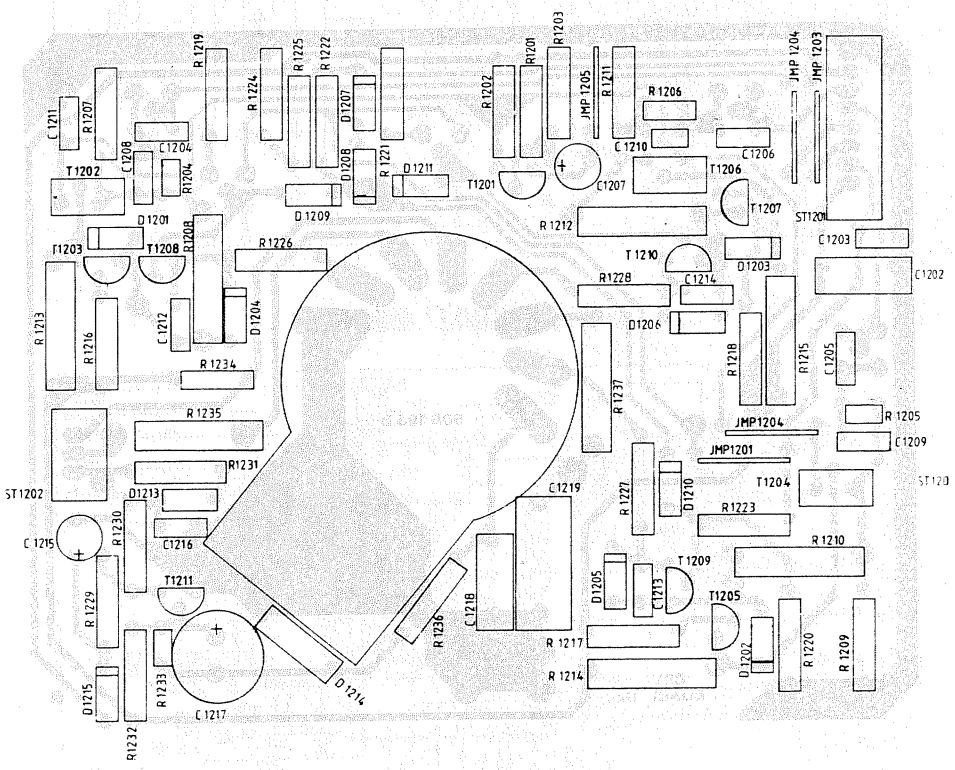
NICAM - DECODER



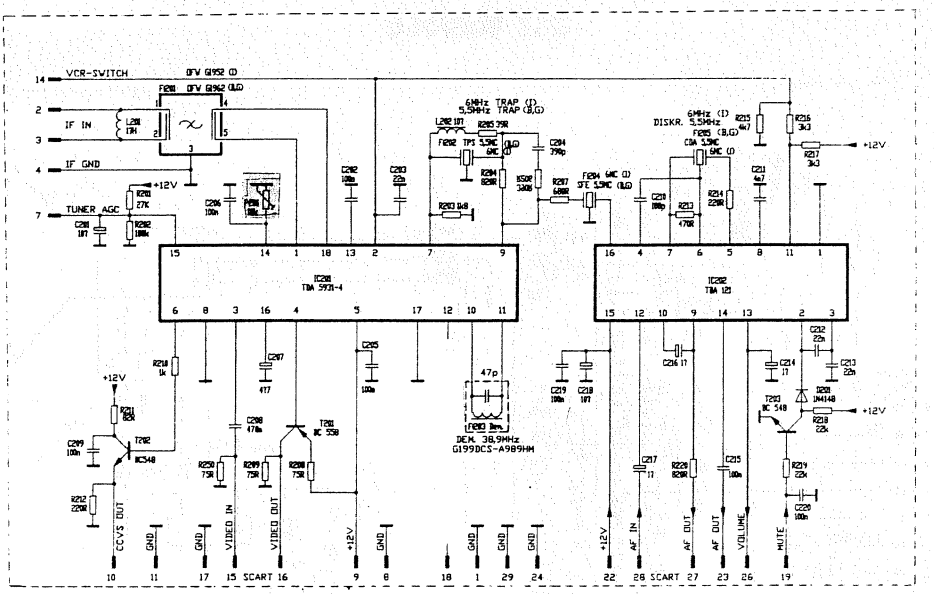
CRT MODULE



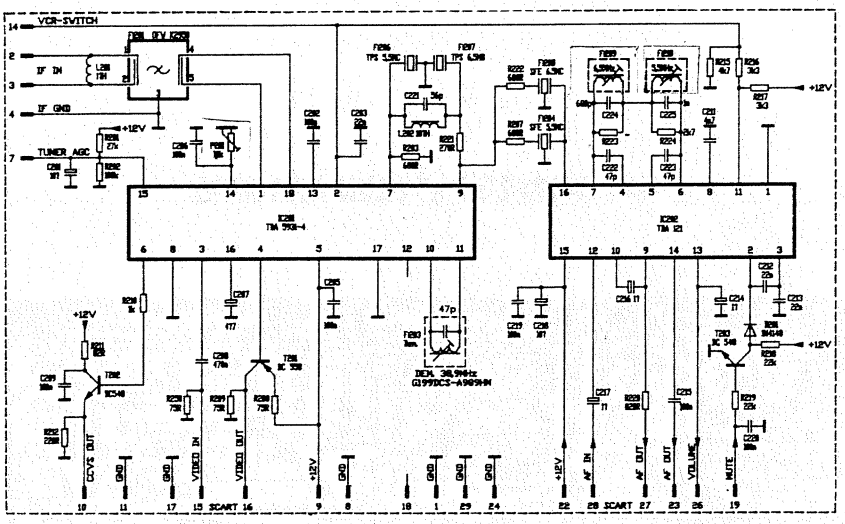
CRT MODULE PATTERN DRAWING



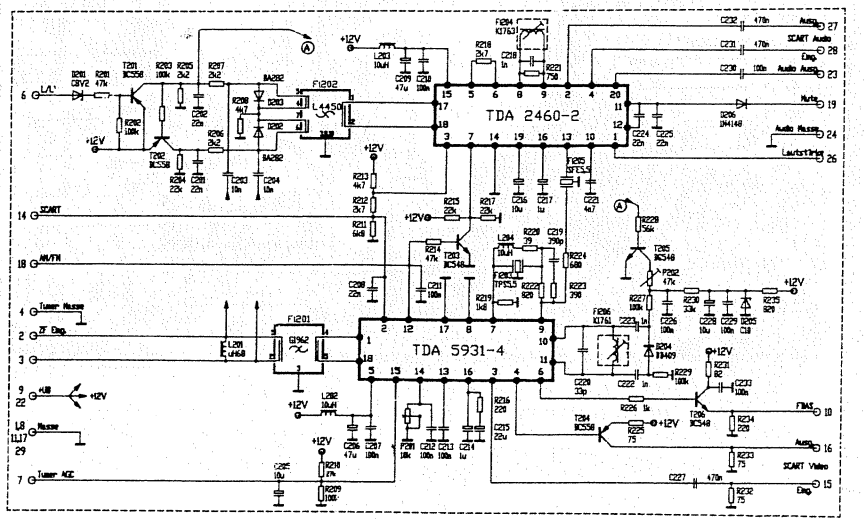
MONO IF B/G (I) MODULE



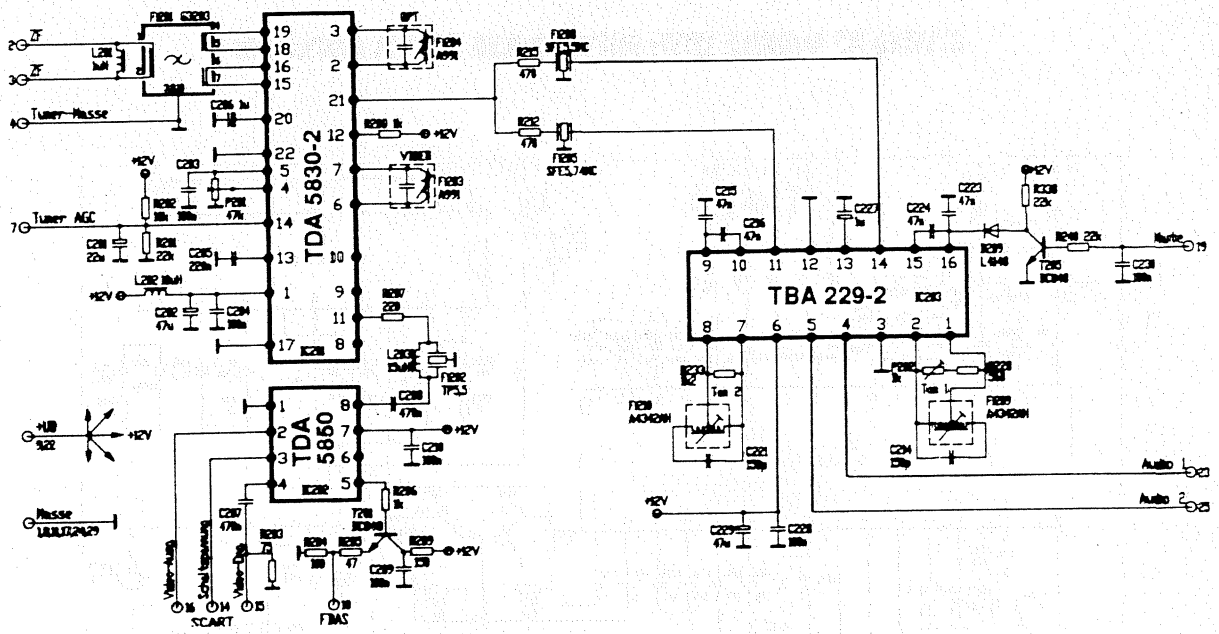
MONO IF BG/DK MODULE



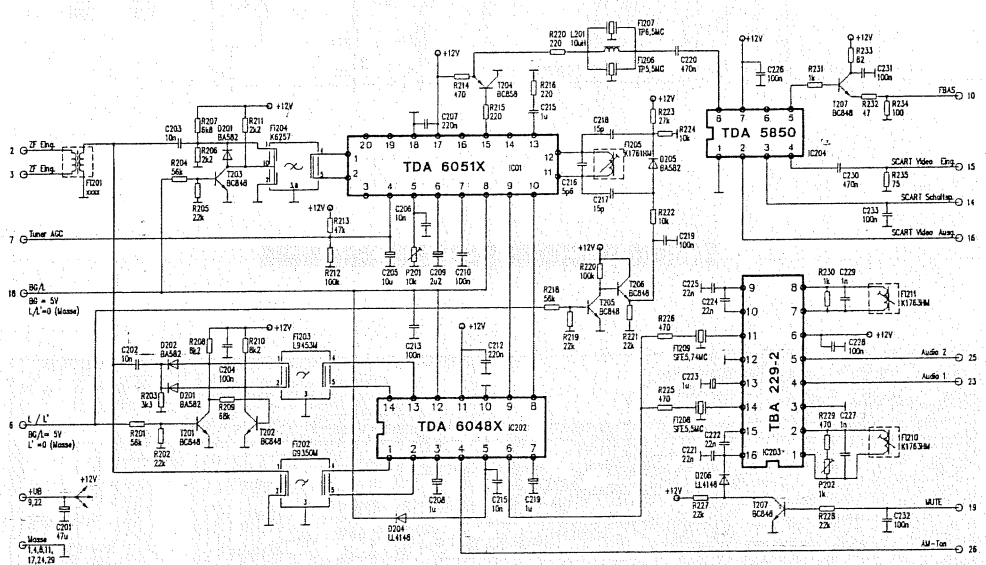
MONO IF BG/LL' MODULE



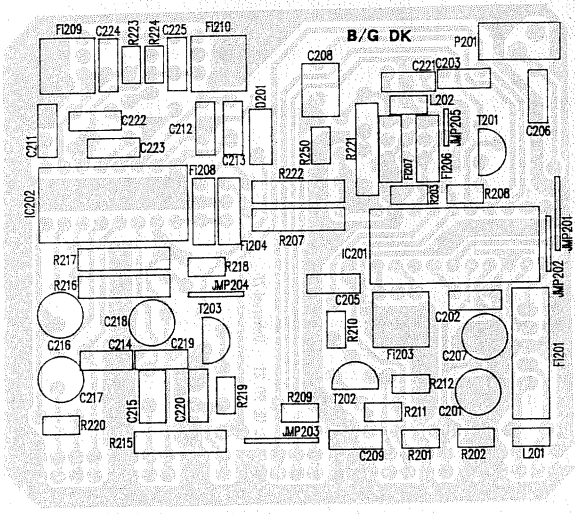
STEREO IF MODULE BG



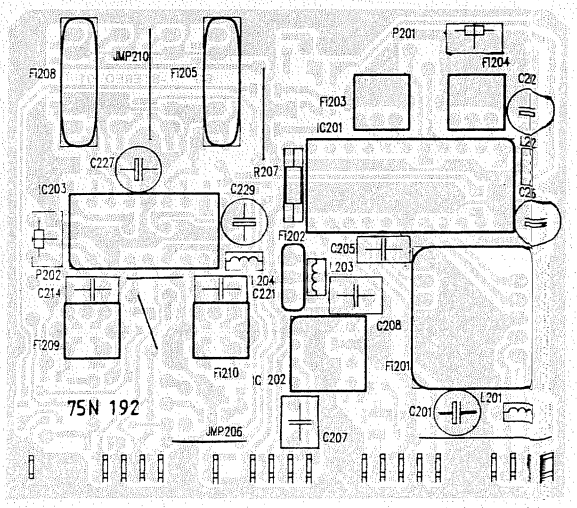
IF STEREO BG/LL' MONO



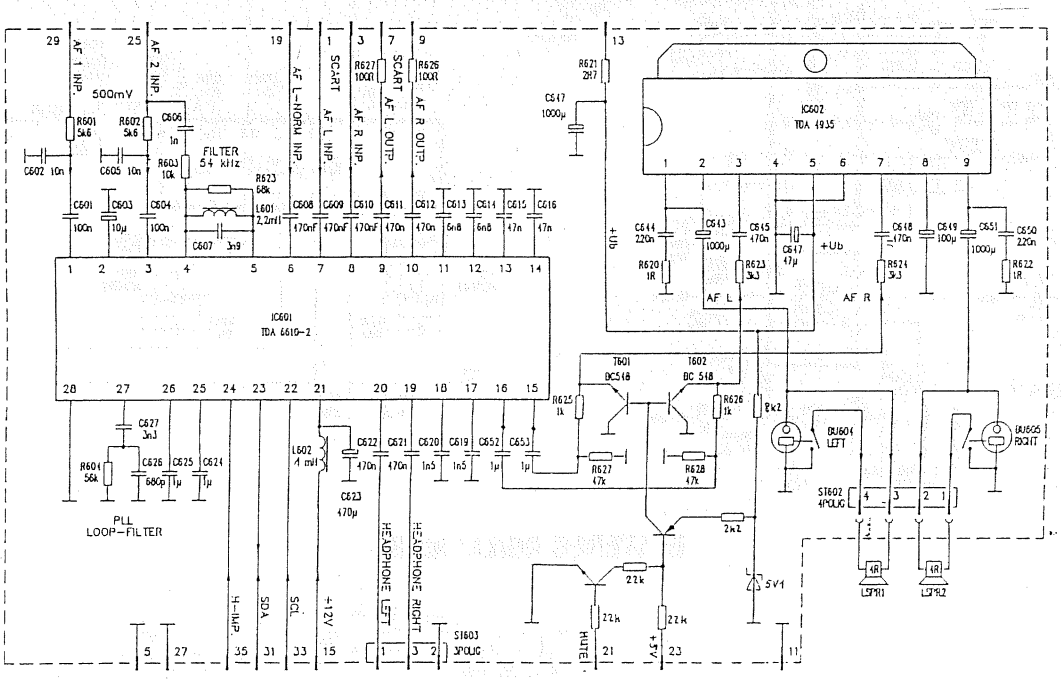
MONO IF PATTERN DRAWING



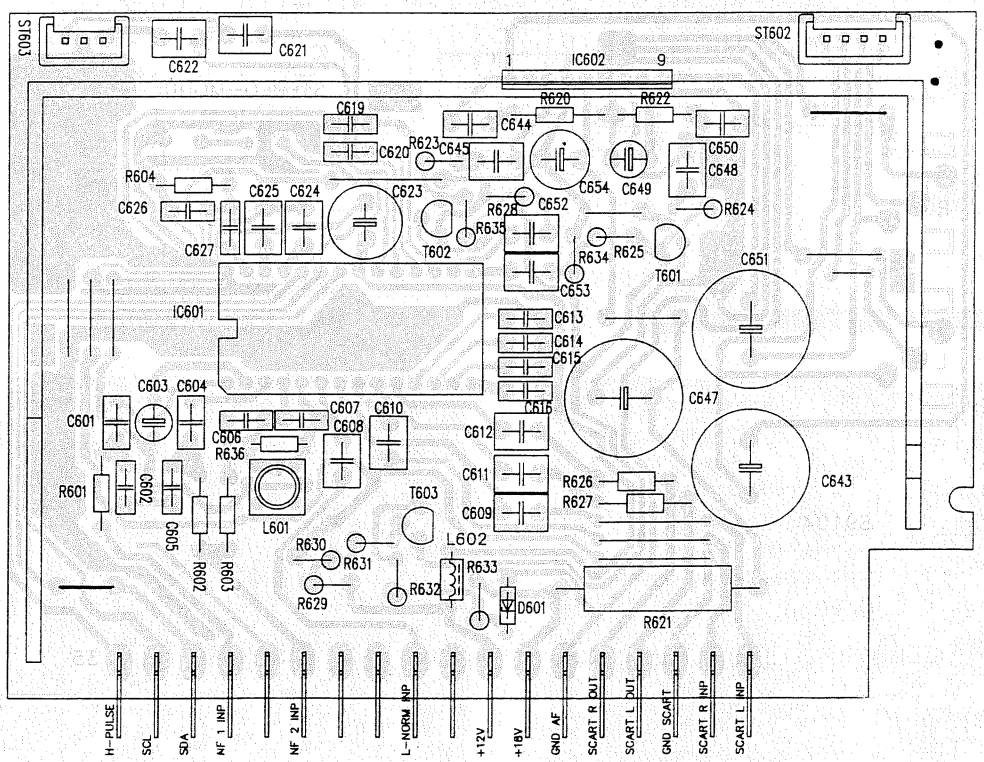
STEREO IF MODULE PATTERN DRAWING



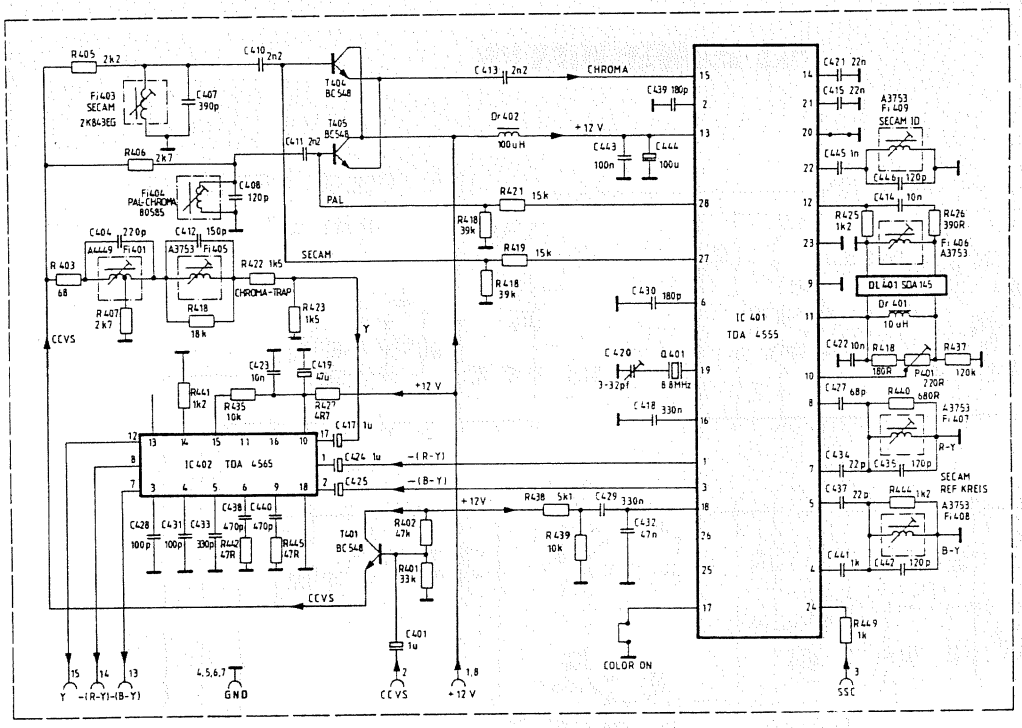
STEREO AF MODULE WITH DECODER AND POWER AMPLIFIER



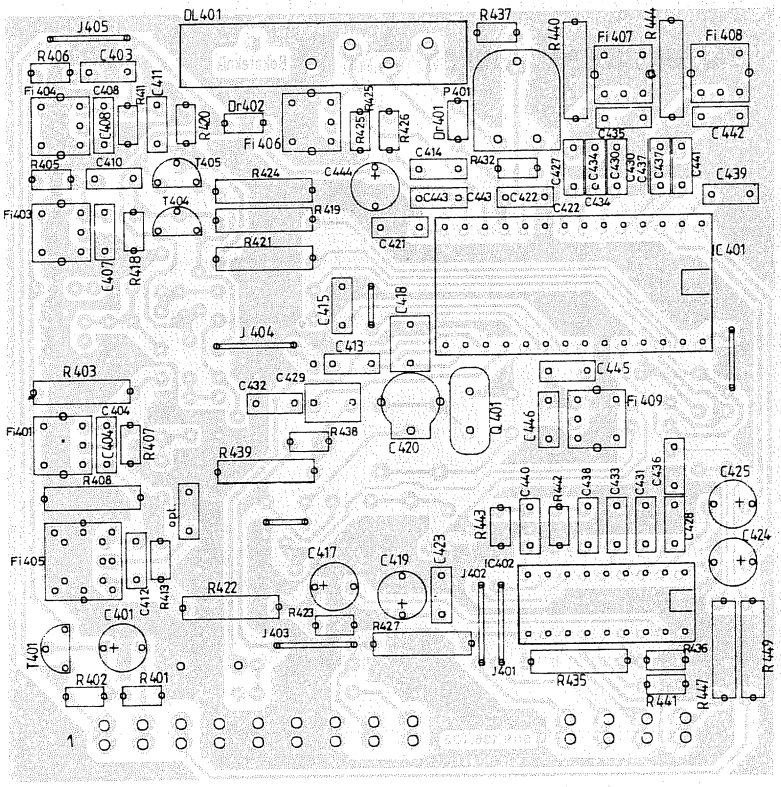
STEREO DECODER PATTERN DRAWING



PAL/SECAM DECODER WITH CTI

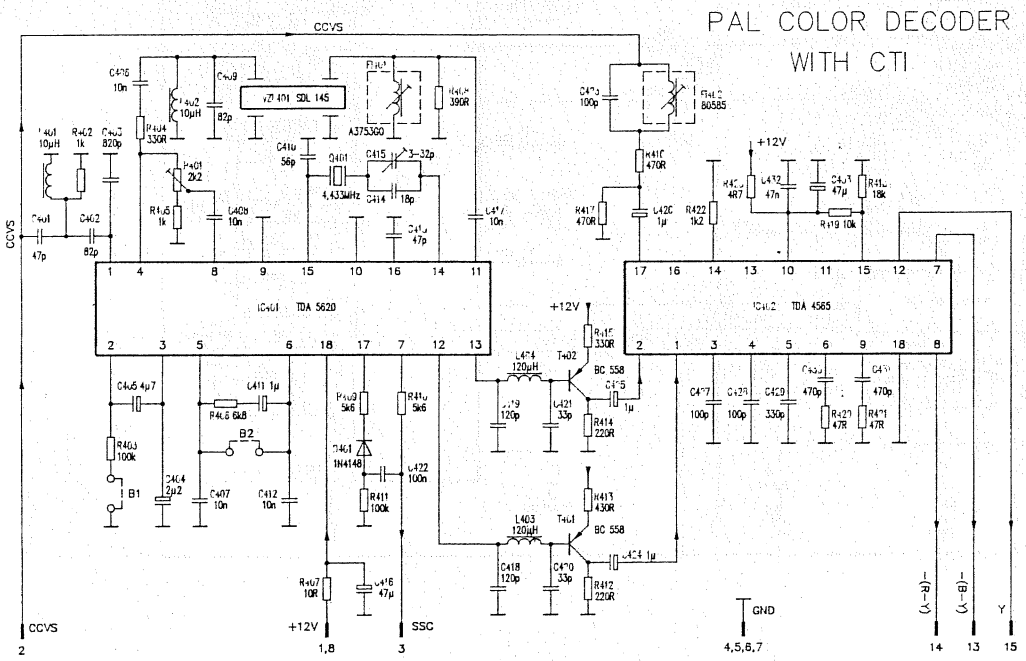


PAL/SECAM MODULE PATTERN DRAWING

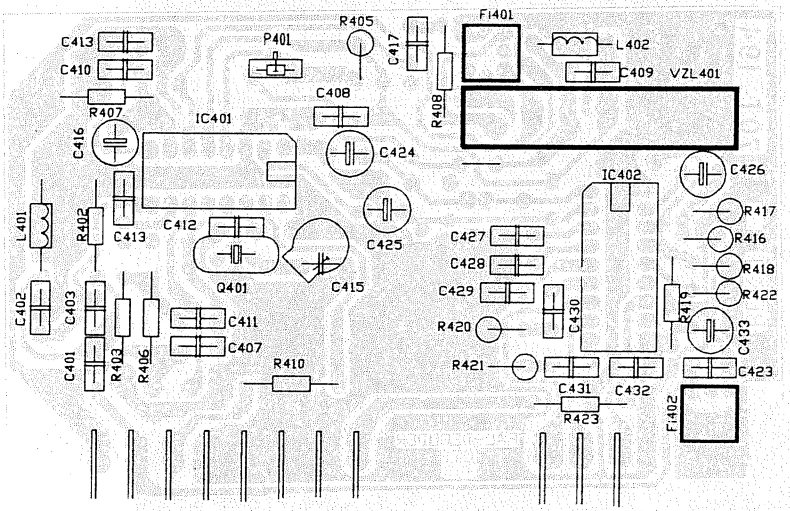


PAL/SECAM

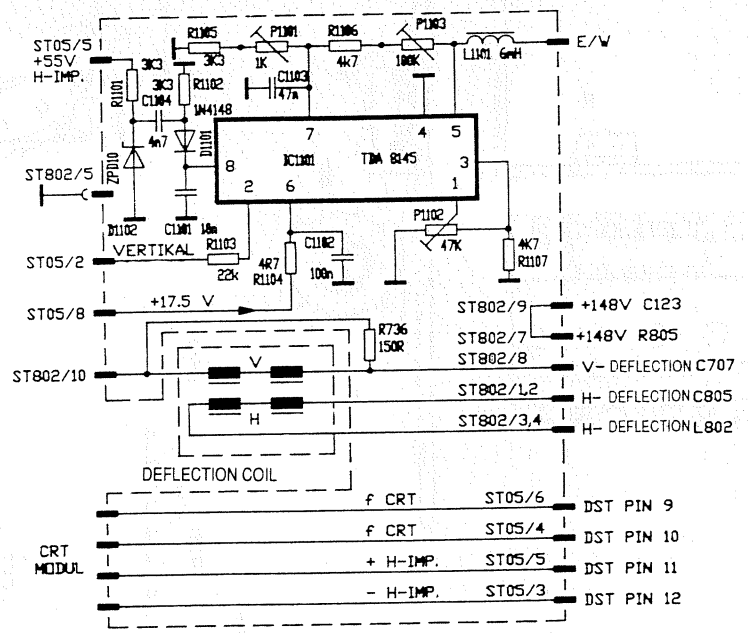
PAL DECODER WITH CTI



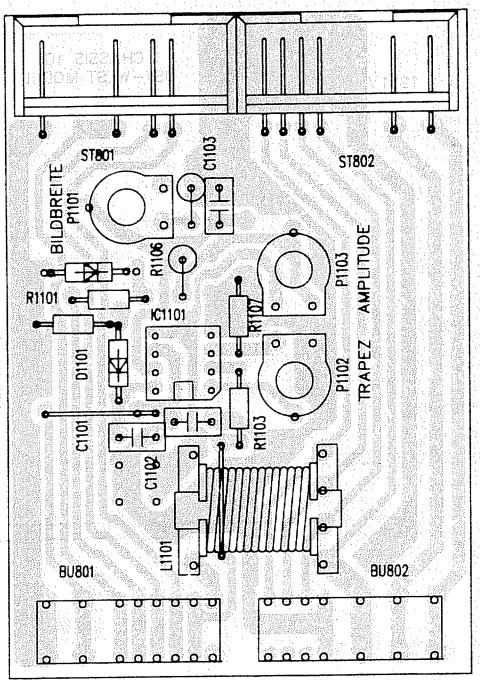
PAL MODULE PATTERN DRAWING

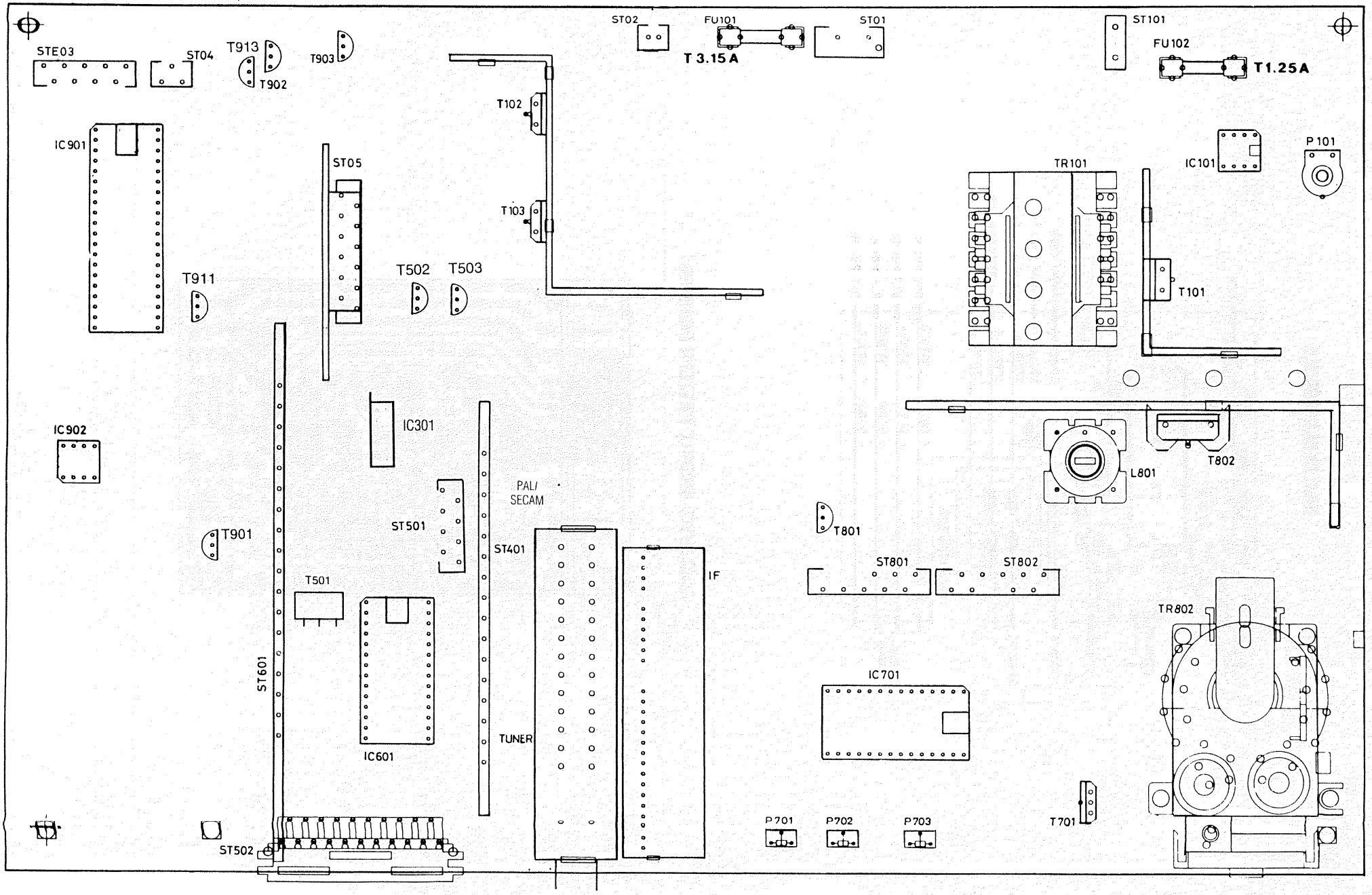


EAST/WEST MODULE



EAST/WEST MODULE PATTERN DRAWING




STE03
ST04
T913
T902
T903
ST02
FU101
T 3.15A
ST01
ST101
FU102
T1.25A
T102
T103
IC901
ST05
T911
T502
T503
TR101
IC101
P101
T101
IC902
IC301
T802
L801
PAL/
SECAM
ST501
ST401
T801
T901
ST801
ST802
T501
IF
TR802
ST601
IC701
TUNER
IC601
P701
P702
P703
T701
ST502

SERVICE ADJUSTMENTS

INTERMEDIATE FREQUENCY BOARD ADJUSTMENT AND CONTROL:

1- Apply 12V DC to 9th and 22nd pins of IF board.

2- Apply 38.5 MHz signal modulated with video signal (step or 2T) and 1kHz sound signal to 2nd or 3rd pins of IF board.

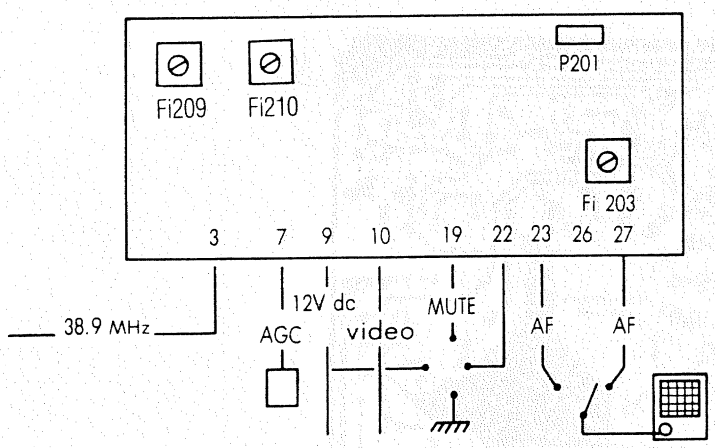
3- After connecting 7th pin of IF board to a voltmeter, see the AGC output change between 0 and 7.5V by adjusting P201 clockwise or counter clockwise. Leave it at its maximum level.

4- Adjust F 203 until obtaining the wave form in Figure 8.
- Apply a voltage of changing between 0.3V and 4.6V DC to 26th pin o the IF board and see the wave shape in Figure 8 from the 27th pin of the board.

5- After grounding 19th pin of the board, see the muting on oscilloscope.

6- Apply 38.9 MHz signal modulated with video signal and 1kHz (6.5 MHz carrier) to pin 3. Adjust Fi209 for optinum waveform on pin 23 or 27 (standard D/K) (Fig.9).

7- Apply 38.9 MHz signal modulated with video signal and 1kHz (5.5 MHz carrier) to pin 3. Adjust Fi210 for optimum waveform on pin 23 or 27. (Standard B/G) (Fig. 9).



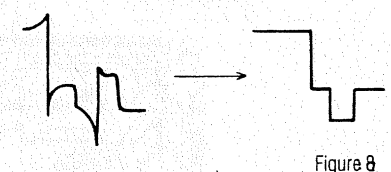


Figure 8

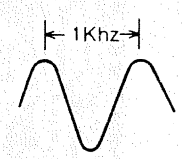


Figure 9

SUPPLY VOLTAGE ADJUSTMENT:

1 – While all controls are set to minimum, P101 is adjusted, so that the voltage difference between ground and R805 or D109 is 125 V DC+1V for 90^0 Sets (148 VDC + 1V for 110^0 Sets)

2– Screen potentiometer on DST is adjusted until snowy picture is just obtained. Depress the NORMAL button on the Remote Control to optain the average contrast, brightness and colour settings.

3– Using a Philips pattern generator or other suitable signal, adjust P701 (horizontal adjustment) and P703 (vertical adjustment) to correctly position the picture. Adjust vertical amplitude with P702 and horizontal amplitude with L901.

AGC ADJUSTMENT:

Input a colour test pattern, the signal input voltage should be 1.5mV=64 dBuV+2dBuV, AGC voltage is observed. While adjusting P201 on IF board by rotating it clockwise, see the increase in DC level.
After obtaining maximum DC value approximately at 8V, adjust P201 until DC level drops to 1V and becomes approximately 7VDC.

SCREEN ADJUSTMENT:

Contrast, Brightness and screen potentiometer are set to minimum.
AV position is selected on TV.
The oscilloscope is connected to the highest test points (either 154, 155 or 156) on CRT.
Screen potentiometer is adjusted, so that the "X" lenght is 135V for 90^0 chassis (158 Vdc for 110^0 chassis) and check the same shape for other test points too.

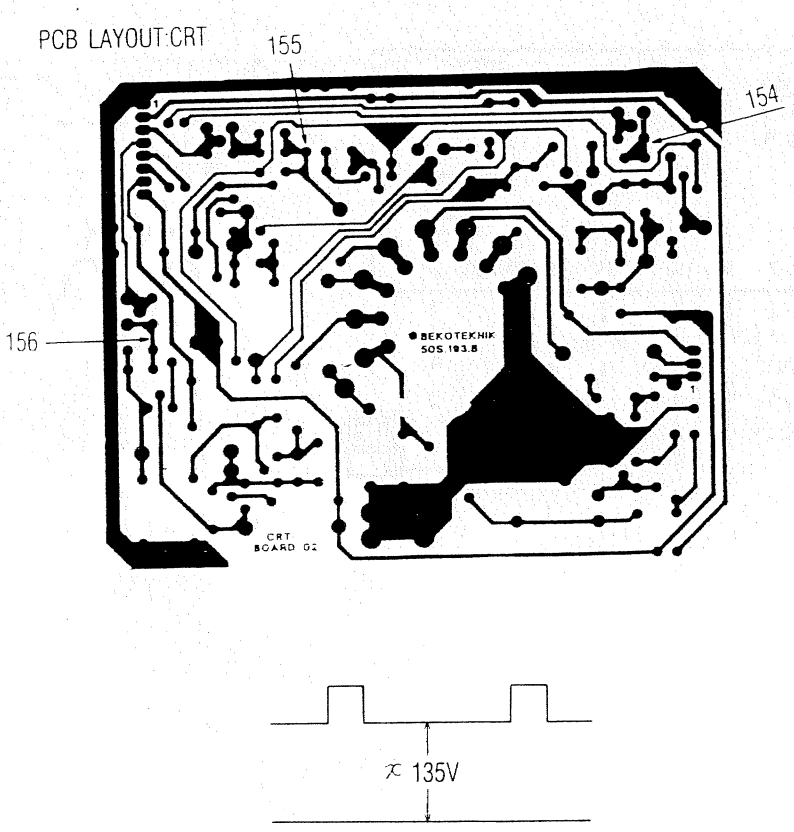
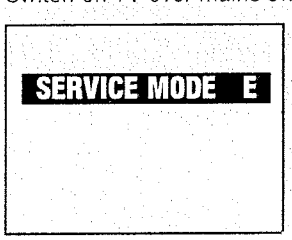


Figure 10

SERVICE MODE ADJUSTMENTS

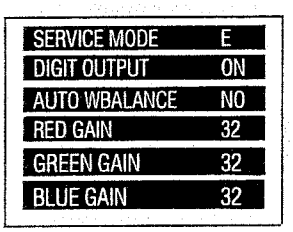
1.0. WHITE BALANCE ADJUSTMENT

1.1. Switch on TV over mains switch while pressing up/down buttons on control unit.



Appears on screen.

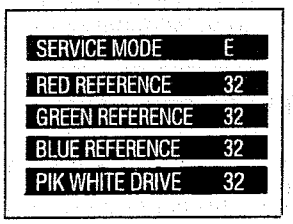
1.2. Push colour button on R/C hand set



Appears on screen.

If auto WBalance is yes push up button.

1.3. Push colour button on remote control hand set repeatedly.



Appears on screen.

Digit output .... Yes

Adjust < Red reference / Green reference / Blue reference > to levels given in below table

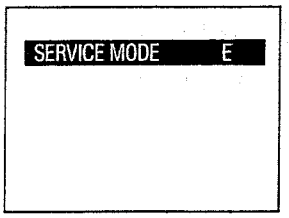
Digit output .... No
Digit output .... Yes

Red gain / Green gain / Blue gain > Adjust to values 20 higher than the peresent ones to increase contrast when needed.

The value of flashing line can be chanced by up or down button.

Switch off and on tv over main switch to
Leave service mode.

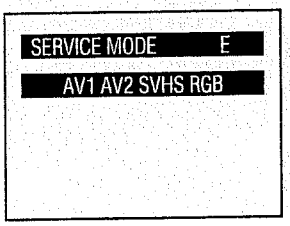
2.0. Selection of external connections
2.1. Switch on TV Over main switch while pressing up and down buttons on R/C control unit.



Appears on screen.

	SAMSUNG	PHILIPS	NOKIA	VIDEO COLOR			
14 "		34					RED REF
		32					GREEN REF
		23					BLUE REF
		32					PEAK WHITE DRIVE
15 "		34					RED REF
		32					GREEN REF
		29					BLUE REF
		32					PEAK WHITE DRIVE
20 "	23						RED REF
	27						GREEN REF
	29						BLUE REF
	32						PEAK WHITE DRIVE
21 "			25	41			RED REF
			28	23			GREEN REF
			24	20			BLUE REF
			32	32			PEAK WHITE DRIVE
25 "			25	41			RED REF
			23	23			GREEN REF
			22	20			BLUE REF
			32	32			PEAK WHITE DRIVE
28 "			25	41			RED REF
			25	23			GREEN REF
			22	20			BLUE REF
			32	32			PEAK WHITE DRIVE

2.2 Push AV button on R/C hand set



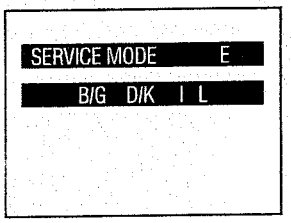
Appears on screen.

By pressing O.K. Button flashing character will turn from white to purple

By pressing (+) or (–) buttons flashing position changes
FOR MONO T.V. AV1 indicates 1. scart

3.0. SYSTEM SELECTION

3.1. Push a/b button on r/c hand set



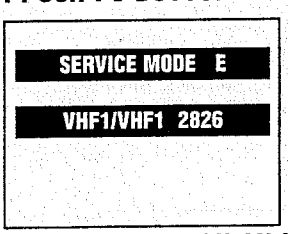
Appears on screen.

3.2. By pressing O.K. Button flashing character will turn from white to purple.

3.3. By pressing (+) or (-) buttons flashing position changes. White characters indicate receivable system.

4.0. CHANNEL COVERAGE SELECTION

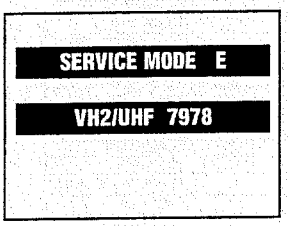
4.1. PUSH PS BUTTON ON R/C HAND SET



Appears on screen. check!

If not, to reach 2826 push up or down button. Mute button changes 3. digit of this number.

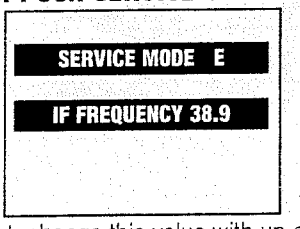
4.2. PUSH PS BUTTON ON R/C HAND SET



Appears on screen. Check!

If not, to reach 7978 push up or down button. Mute button changes 3. Digit of this number

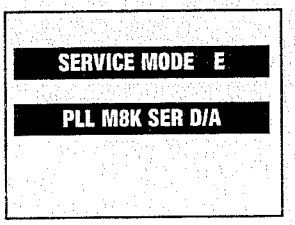
4.3. PUSH SERVICE SWITCH ON R/C HAND SET



Appears on screen. Check!

If not, change this value with up or down buttons.

4.4. PUSH SERVICE SWITCH ON R/C HAND SET



Appears on screen.

Press O.K. Button and convert colour of flashing characters from purple to white. Repeat this procedure for all characters on this menu.

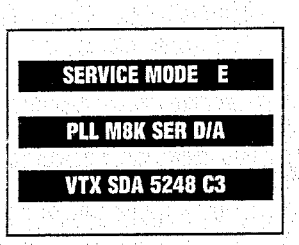
M8K WHITE 100Programme
M8K PURPLE 50Programme

5.0. PREPARING A SERVICE R/C HAND SET

5.1. MOUNT A MICRO SWITCH ON R/C HAND SET
5.2. CONNECT PIN 10 AND 19 OF R/C IC KS 51800 BY A MICRO SWITCH.

When micro switch pushed these pins are short.

6.0. SETTINGS OF TELETEXT
6.1. PUSH T.V.-T.T. BUTTON ON R/C HAND SET

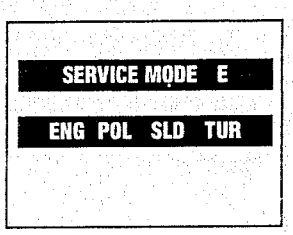


Appears on screen.

The digit behind C determines teletext decoding languages.
Change this digit by pushing up or down buttons.

C1. English, German, Swedish, Italian, French, Spanish.
C2. English, German, Scandinavian, German, Serbocroat, Czech-slovak, Romanian.
C3. English, German, Swedish, Italian, French, Spanish, Turkish.

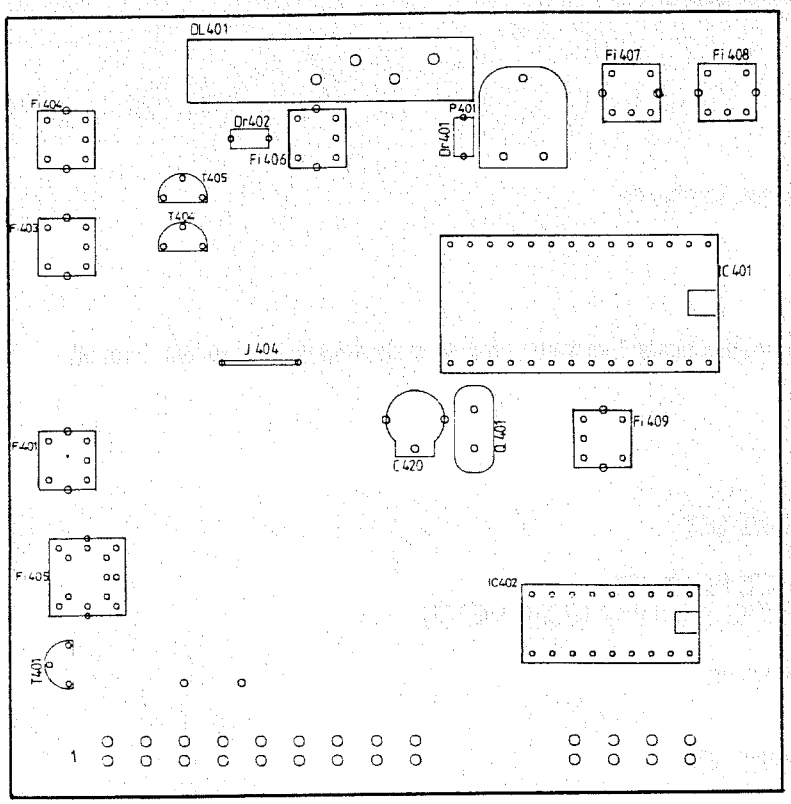
6.2. PUSH T.V.-T.T BUTTON



Appears on screen.

From this menu teletext message language can be choosen. Pressing O.K. Button changes colour and pressing up or down button changes position of flashing characters. White language indication shows teletext message language.

PAL/SECAM BOARD ADJUSTMENT AND CONTROL



PAL ADJUSTMENT:

1- FBAS Colour Bar signal is applied to 2nd pin of the board.

2- While the signal on the emitter of T405 is observed on the oscilloscope, colour carrier is adjusted to its maximum value with Fi404.

REFERENCE OSCILLATOR ADJUSTMENT:

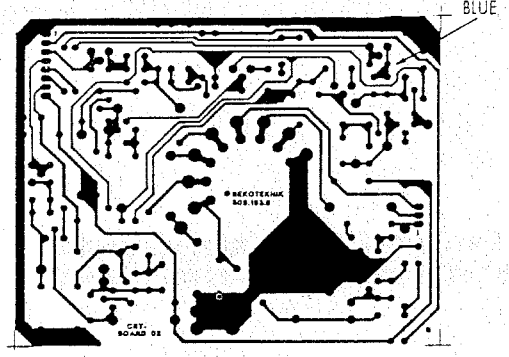
1- The 17th pin of the TDA4555 is grounded.

2- Colour flow on screen is minimized with C420.

LUMINANCE ADJUSTMENT:

1- Colour carrier or 15th pin of the board is minimized with Fi401.

PCB LAYOUT: CRT



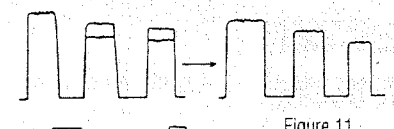


Figure 11

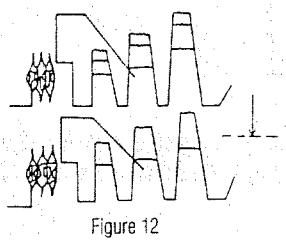


Figure 12

PAL ADJUSTMENT:

1– Connect oscilloscope probe to "Blue" input and adjust Fi406 to see waveform in Figure 11.
2– Apply DEM test signal to pin 2 of PAL/SECAM module.
3– Adjust peaks as shown in Figure 12. Check 4.43 MHz section with DEM pattern.

SECAM ADJUSTMENT:

CHROMA ADJUSTMENT:

1– Apply colour bar signal to pin 2 of module.

2– Observe the signal on the emitter of T404 with an oscilloscope.
Adjust the peaks with Fl403 Bell filter as shown in Figure 13.

SECAM IDENTIFICATION ADJUSTMENT

1– Connect a multimeter with high internal resistance (10M) between pin 21 of TDA4555 and ground.

2– Adjust coil Fl409 for maximum potential difference.

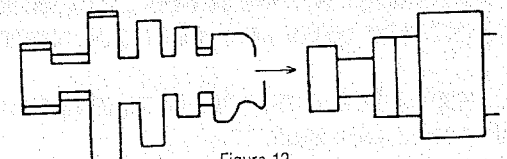


Figure 13

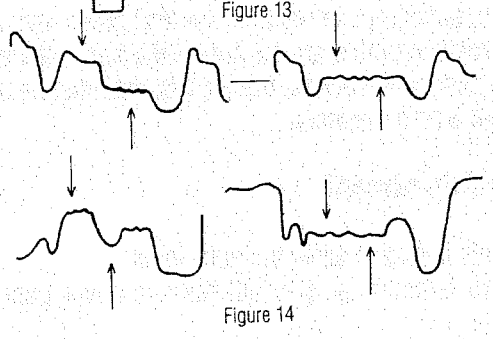


Figure 14

SECAM COLOUR TRAP ADJUSTMENT:

1- Observe Y Signal on pin 12 of IC402 with an oscilloscope, adjust colour carrier to its minimum level with Fi405.

SECAM DISCRIMINATOR ADJUSTMENT:

1- Observe R-Y and B-Y signals on pins 14 and 15 of Pal/Secam module.

2- The signal peaks indicated with arrows in Figure 14 should be adjusted for the same level.

CONVERGENCE ADJUSTMENTS

Note: Before attempting any convergence adjustments, the receiver should be operated for at least fifteen minutes.

• Centre Convergence Adjustment

1. Receive crosshatch pattern with a colour bar signal generator.
2. Adjust the BRIGHTNESS and CONTRAST Controls for well defined pattern.
3. Adjust two tabs of the 4-Pole Magnets to change the angle between them (See figure 16.) and superimpose red and blue vertical lines in the centrel area of the picture screen. (See figure 17.)
4. Turn the both tabs at the same time keeping the constant angle to superimpose red and blue horizontal lines at the centre of the screen. (See figure 17.)
5. Adjust two tabs of 6-Pole Magnets to superimpose red/blue line and green one. Adjusting the angle affects the vertical lines and rotating both magnets affects the horizontal lines.
6. Repeat adjustments 3,4,5 to ensure best convergence, the adjustment must be undertaken with great care because of the interaction between 4 and 6 pole magnets.

• Circumference Convergence Adjustment

1. Loosen the clamping screw of deflection yoke to allow the yoke to tilt.
2. Put a wedge as shown in figure 15 temporarily. (Do not remove cover paper on adhesive part of the wedge.)
3. Tilt front of the deflection yoke up or down to obtain better convergence in circumference. (See figure 17.) Push the mounted wedge into the space between picture tube and the yoke to fix the yoke temporarily.
4. Put other wedge into bottom space and remove the cover paper to stick.
5. Tilt front of the yoke right or left to obtain better convergence in circumference. (See figure 17.)
6. Keep the yoke position and put another wedge in either upper space. Remove cover paper and stick the wedge on picture tube to fix the yoke.
7. Detach the temporarily mounted wedge and put it in another upper space. Stick it on picture tube to fix the yoke.
8. After fixing three wedges, recheck overall convergence. Tighten the screw firmly to fix the yoke and check the yoke is firm.
9. Stick 3 adhesive tapes on wedges.

CONVERGENCE COMPENSATOR

Compensators L462A and L462B are used to correct misconvergence (Red-Green) at the top center or bottom center on screen, when the misconvergence is still evident even though the yoke adjustment is tried.
Compensator L462C is also used to correct misconvergence (Vertical shift of Red or Blue) at four corners on screen.

1. To correct horizontal misconvergence (Red-Green), put compensator L462A on the yoke back (see figure right) to find a position for minimizing misconvergence. Mark the position and remove protective paper on the rear of L462A to stick it in place. Apply adhesives on both yoke and L462A.
2. To correct vertical misconvergence (Red-Green), put the tips of compensator L462B into either of the holes on the yoke core and apply adhesives.
3. To correct up or down shift of Red at top right or bottom right corner, put compensator L462C at point 1 or 2 on the picture tube (see figure right.) to find a position for minimizing misconvergence. Mark the position and remove protective paper on the rear of L462C to stick it in place.

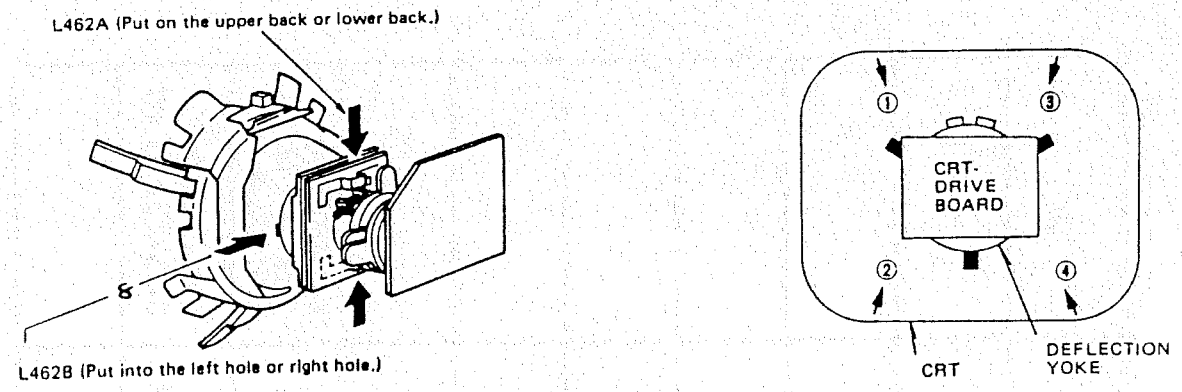


Figure 15.

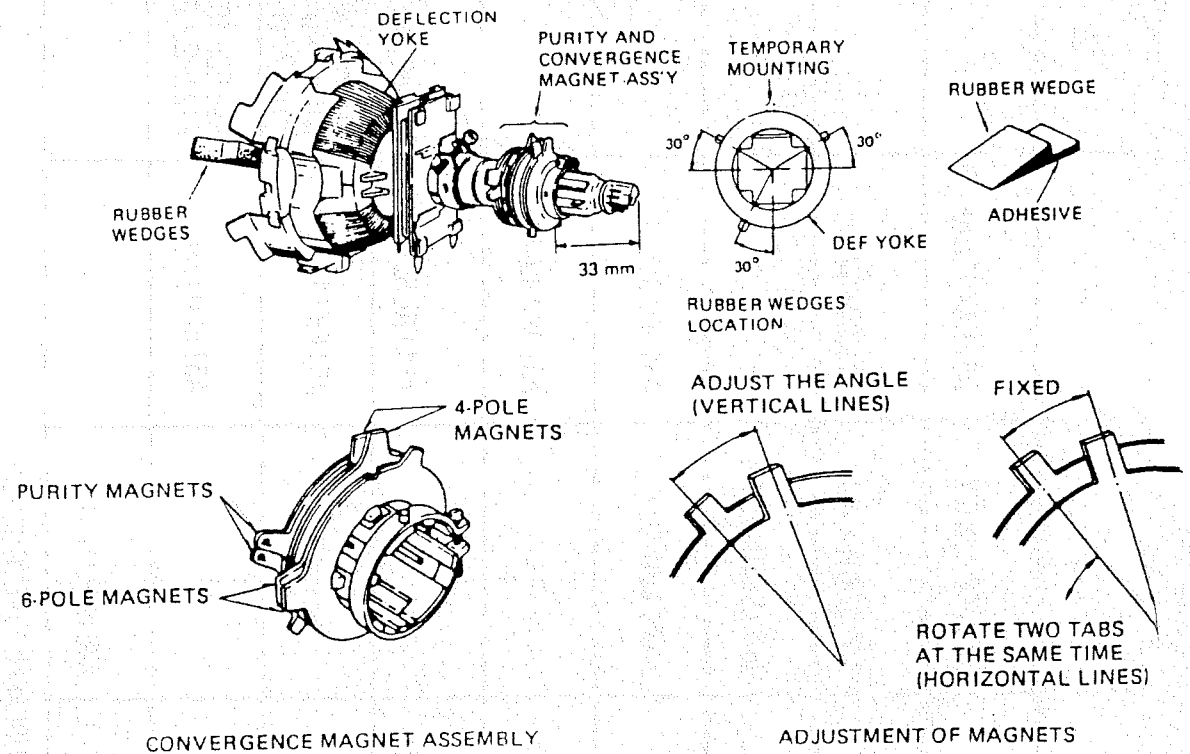
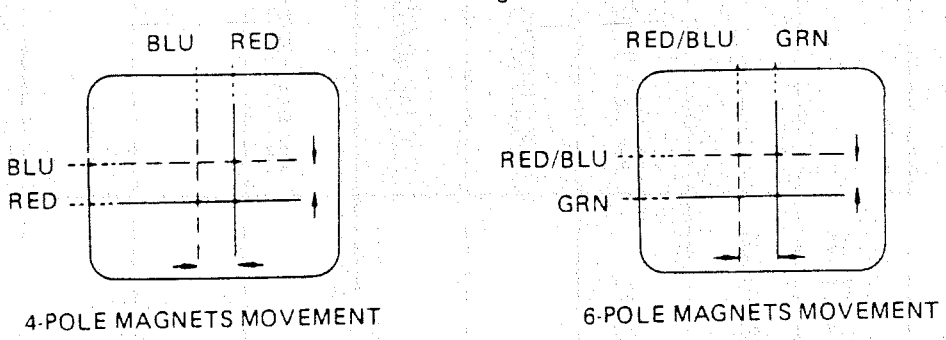
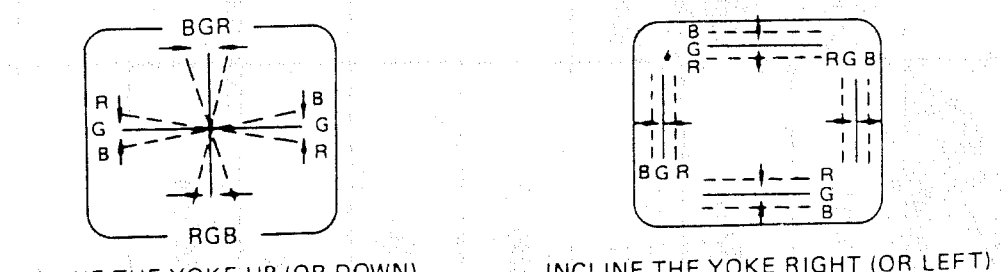


Figure 16.



Centre Convergence by Convergence Magnets



Circumference Convergence by DEF Yoke

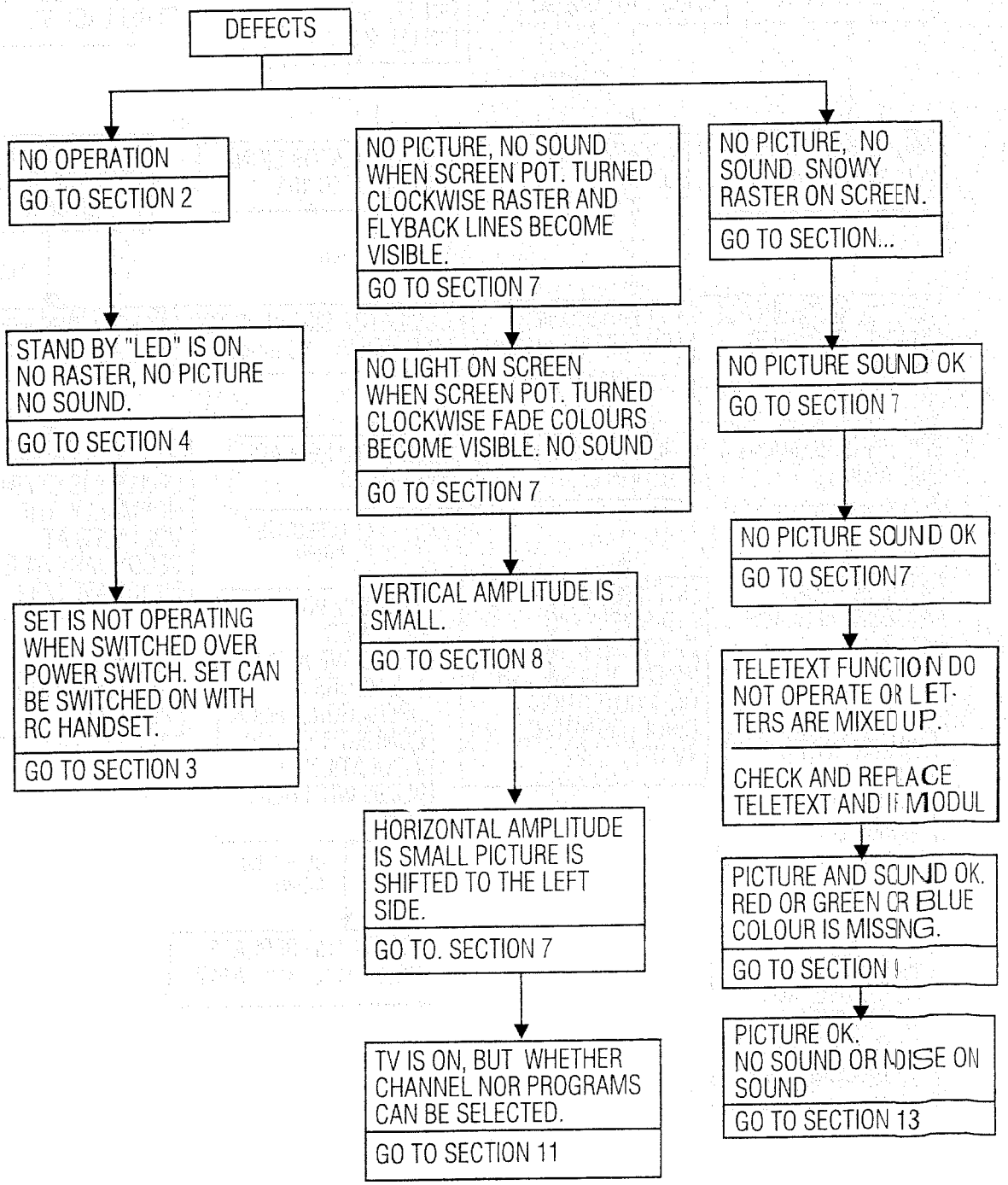
Dot Movement Pattern

CHSASIS / SCREEN SIZES / CPT MANUFACTURES	14"	15"	20"	21"	25"	28"
GOLDSTAR	A34 KCQ 12XX01 (T) 370 HUB 22-TC01		A48 KCS 12XX27	A51 KAK 12XX05 (T)		
SAMSUNG	37 GGA 85X-TC01 3708B		A51 GGD95X-TC	54 HGB 99X-TC		
ORION	A343 LL70X23	A36 JSW 90X01	A48 ELL 90X01 (T)			
HITACHI		A36 JUF60X06	A48 JSK61X01 (T)	A51 JFC 61X13		
TOSHIBA		A36 JAR 40X03 (T)		A51 JRU 40X01 (T)		
PHILIPS		A36 EAM 00X01 (T)		A51 EAL 55X10	(A59 EAK71X11)	
VİDEOCOLOR				A51 EBV 13XX01	A59 ECY 13X38 R1235: 1 OHM, 1W L810: 90 uH	A66 ECY 13X38 R1235 : 1 OHM, 1W L810 : 70 uH
NOKIA				A51 ECQ 10X01	A59 ECF 10X05 R1235:2.2 OHM, 1W.	A66 ECF 10X05 R1235:2.2 OHM, 1W
SEB			A48 ECR 11X01			

R1235 IS FOR ALL CRT's with 90° DEFLECTION ANGLE IS 0.1 OHM FUSEABLE TYPE RESISTOR.

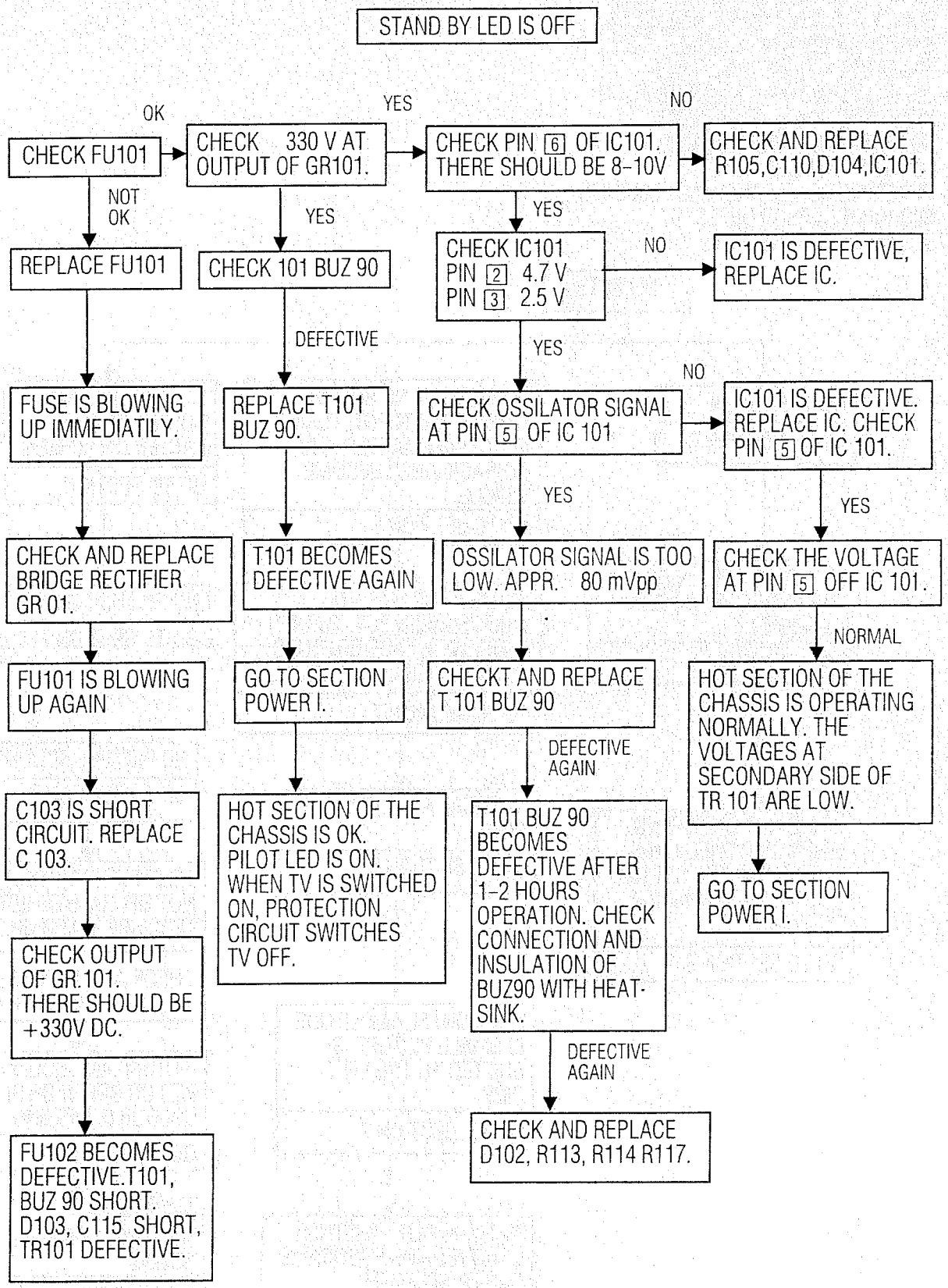
① TROUBLE SHOOTING

1 -TROUBLE SHOOTING GUIDE
2 -GENERAL POWER SUPPLY DEFECTS
3 -POWER I-POWER SUPPLY DEFECTS
4 -POWER II-POWER SUPPLY DEFECTS
5 -SWITCH MODE TRANSFORMER DEFECTS
6 -PROTECTION CIRCUIT DEFECTS
7 -DEFECTS RELATED TO DARK SCREEN
8 -DEFLECTION CIRCUIT DEFECTS
9 -TEA 2029 AND PERIPHERIAL DEFECTS
10 -COLOUR DECODER DEFECTS
11 -CRT DRIVE BOARD AND IC501 DEFECTS
12 -MICROPROCESSOR DEFECTS
13 -SOUND CIRCUIT DEFECTS

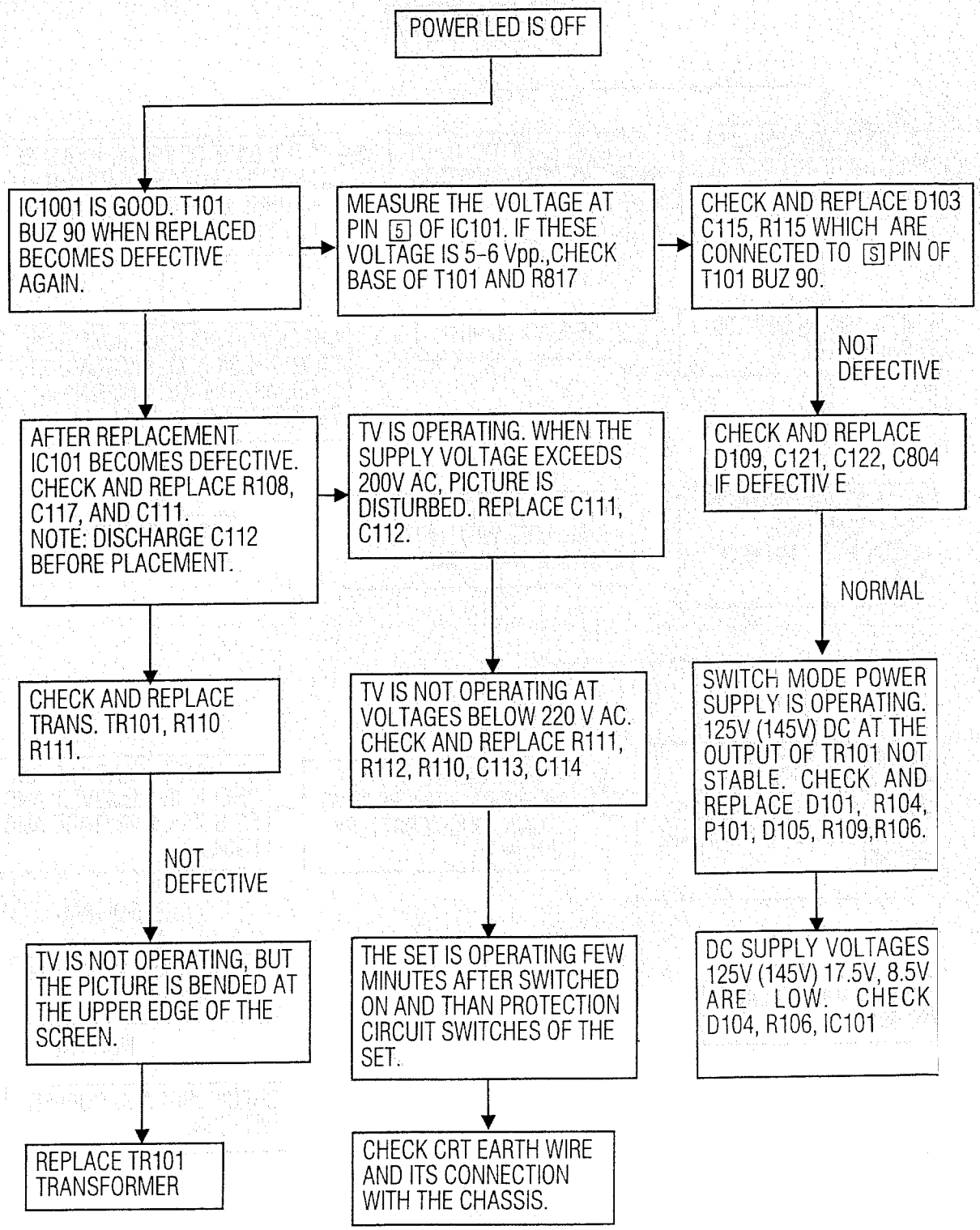

DEFECTS
NO OPERATION
GO TO SECTION 2
STAND BY "LED" IS ON NO RASTER, NO PICTURE NO SOUND.
GO TO SECTION 4
SET IS NOT OPERATING WHEN SWITCHED OVER POWER SWITCH. SET CAN BE SWITCHED ON WITH RC HANDSET.
GO TO SECTION 3
NO PICTURE, NO SOUND WHEN SCREEN POT. TURNED CLOCKWISE RASTER AND FLYBACK LINES BECOME VISIBLE.
GO TO SECTION 7
NO LIGHT ON SCREEN WHEN SCREEN POT. TURNED CLOCKWISE FADE COLOURS BECOME VISIBLE. NO SOUND
GO TO SECTION 7
VERTICAL AMPLITUDE IS SMALL.
GO TO SECTION 8
HORIZONTAL AMPLITUDE IS SMALL PICTURE IS SHIFTED TO THE LEFT SIDE.
GO TO. SECTION 7
TV IS ON, BUT WHETHER CHANNEL NOR PROGRAMS CAN BE SELECTED.
GO TO SECTION 11
NO PICTURE, NO SOUND SNOWY RASTER ON SCREEN.
GO TO SECTION...
NO PICTURE SOUND OK
GO TO SECTION 7
NO PICTURE SOUND OK
GO TO SECTION7
TELETEXT FUNCTION DO NOT OPERATE OR LETTERS ARE MIXED UP.
CHECK AND REPLACE TELETEXT AND IF MODUL
PICTURE AND SOUND OK. RED OR GREEN OR BLUE COLOUR IS MISSNG.
GO TO SECTION 1
PICTURE OK. NO SOUND OR NOISE ON SOUND
GO TO SECTION 13

NOTE: ALL ANALOG CONTROL (LUMINANCE, CONTRAST, COLOUR, VOLUME), SHOULD BE AT MEDIUM LEVEL.

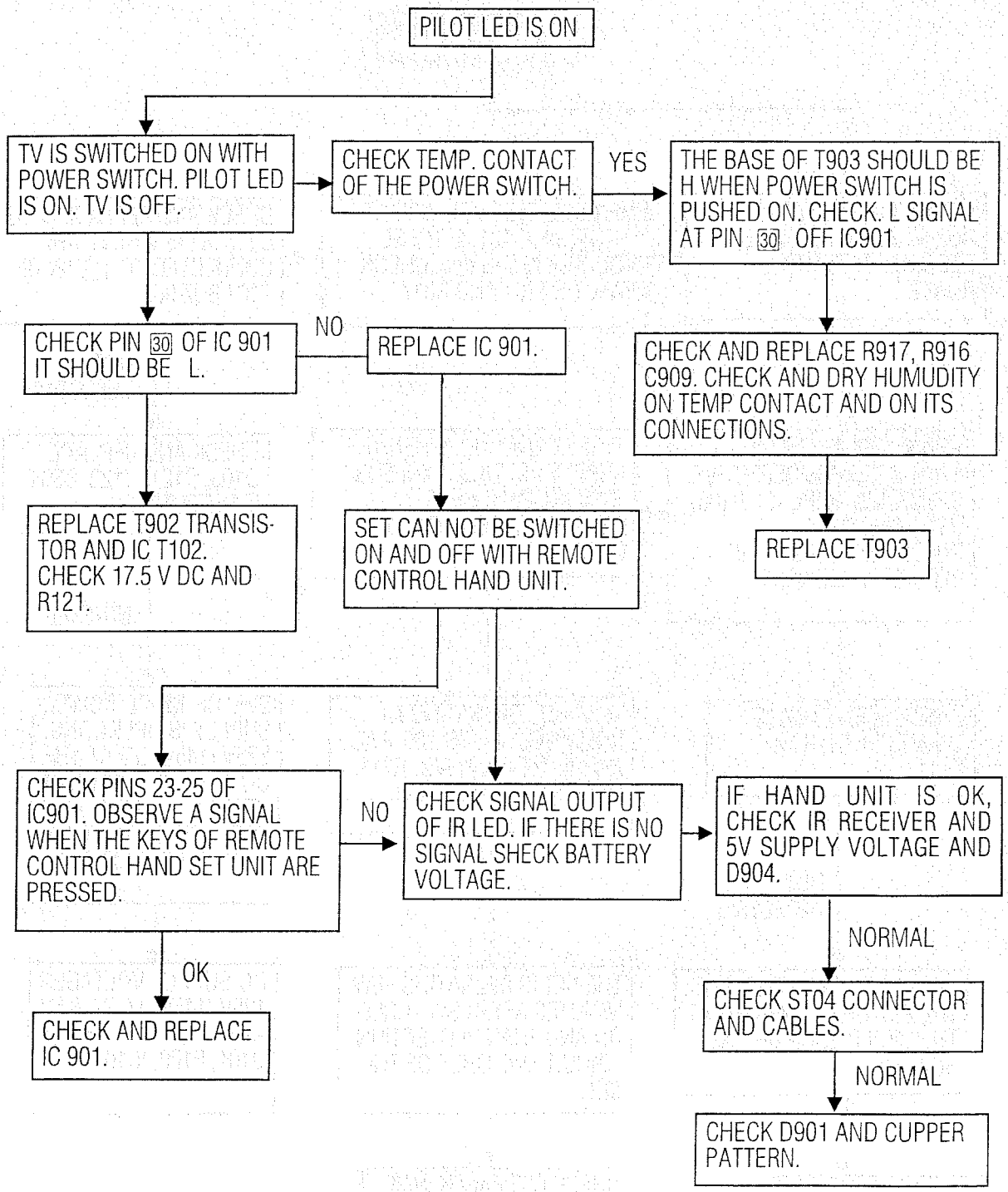
② NO OPERATION


STAND BY LED IS OFF
CHECK FU101
OK
NOT OK
CHECK 330 V AT OUTPUT OF GR101.
YES
CHECK PIN [6] OF IC101. THERE SHOULD BE 8-10V
NO
CHECK AND REPLACE R105,C110,D104,IC101.
REPLACE FU101
YES
CHECK 101 BUZ 90
CHECK IC101 PIN [2] 4.7 V PIN [3] 2.5 V
NO
IC101 IS DEFECTIVE, REPLACE IC.
DEFECTIVE
YES
FUSE IS BLOWING UP IMMEDIATILY.
REPLACE T101 BUZ 90.
CHECK OSSILATOR SIGNAL AT PIN [5] OF IC 101
NO
IC101 IS DEFECTIVE. REPLACE IC. CHECK PIN [5] OF IC 101.
YES
YES
CHECK AND REPLACE BRIDGE RECTIFIER GR 01.
T101 BECOMES DEFECTIVE AGAIN
OSSILATOR SIGNAL IS TOO LOW. APPR. 80 mVpp
CHECK THE VOLTAGE AT PIN [5] OFF IC 101.
NORMAL
FU101 IS BLOWING UP AGAIN
GO TO SECTION POWER I.
CHECKT AND REPLACE T 101 BUZ 90
HOT SECTION OF THE CHASSIS IS OPERATING NORMALLY. THE VOLTAGES AT SECONDARY SIDE OF TR 101 ARE LOW.
DEFECTIVE AGAIN
C103 IS SHORT CIRCUIT. REPLACE C 103.
HOT SECTION OF THE CHASSIS IS OK. PILOT LED IS ON. WHEN TV IS SWITCHED ON, PROTECTION CIRCUIT SWITCHES TV OFF.
T101 BUZ 90 BECOMES DEFECTIVE AFTER 1-2 HOURS OPERATION. CHECK CONNECTION AND INSULATION OF BUZ90 WITH HEAT-SINK.
GO TO SECTION POWER I.
CHECK OUTPUT OF GR.101. THERE SHOULD BE +330V DC.
DEFECTIVE AGAIN
CHECK AND REPLACE D102, R113, R114 R117.
FU102 BECOMES DEFECTIVE.T101, BUZ 90 SHORT. D103, C115 SHORT, TR101 DEFECTIVE.

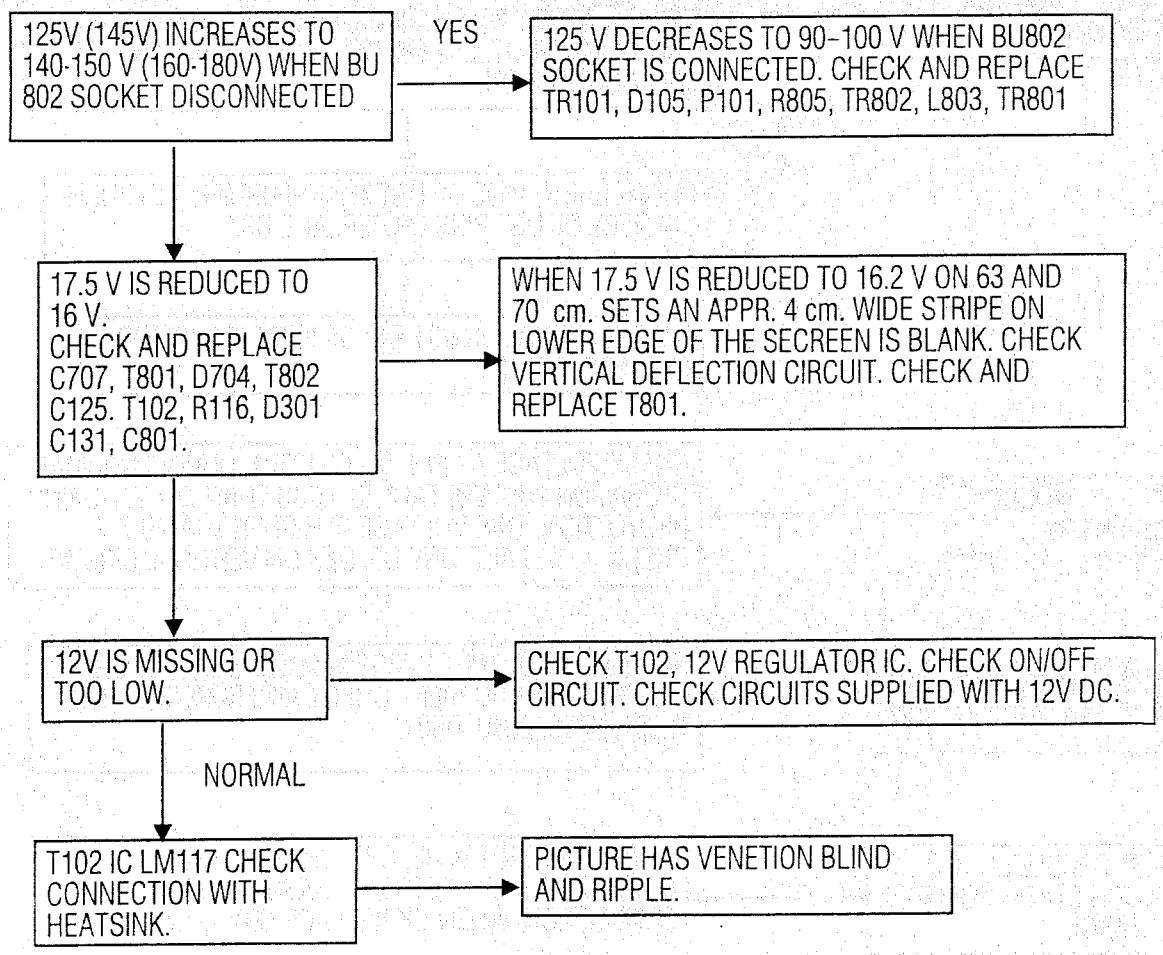
③
POWER I DEFECTS


POWER LED IS OFF
IC1001 IS GOOD. T101 BUZ 90 WHEN REPLACED BECOMES DEFECTIVE AGAIN.
MEASURE THE VOLTAGE AT PIN [5] OF IC101. IF THESE VOLTAGE IS 5-6 Vpp.,CHECK BASE OF T101 AND R817
CHECK AND REPLACE D103 C115, R115 WHICH ARE CONNECTED TO [5] PIN OF T101 BUZ 90.
NOT DEFECTIVE
AFTER REPLACEMENT IC101 BECOMES DEFECTIVE. CHECK AND REPLACE R108, C117, AND C111. NOTE: DISCHARGE C112 BEFORE PLACEMENT.
TV IS OPERATING. WHEN THE SUPPLY VOLTAGE EXCEEDS 200V AC, PICTURE IS DISTURBED. REPLACE C111, C112.
CHECK AND REPLACE D109, C121, C122, C804 IF DEFECTIV E
NORMAL
CHECK AND REPLACE TRANS. TR101, R110 R111.
TV IS NOT OPERATING AT VOLTAGES BELOW 220 V AC. CHECK AND REPLACE R111, R112, R110, C113, C114
SWITCH MODE POWER SUPPLY IS OPERATING. 125V (145V) DC AT THE OUTPUT OF TR101 NOT STABLE. CHECK AND REPLACE D101, R104, P101, D105, R109,R106.
NOT DEFECTIVE
TV IS NOT OPERATING, BUT THE PICTURE IS BENDED AT THE UPPER EDGE OF THE SCREEN.
THE SET IS OPERATING FEW MINUTES AFTER SWITCHED ON AND THAN PROTECTION CIRCUIT SWITCHES OF THE SET.
DC SUPPLY VOLTAGES 125V (145V) 17.5V, 8.5V ARE LOW. CHECK D104, R106, IC101
REPLACE TR101 TRANSFORMER
CHECK CRT EARTH WIRE AND ITS CONNECTION WITH THE CHASSIS.

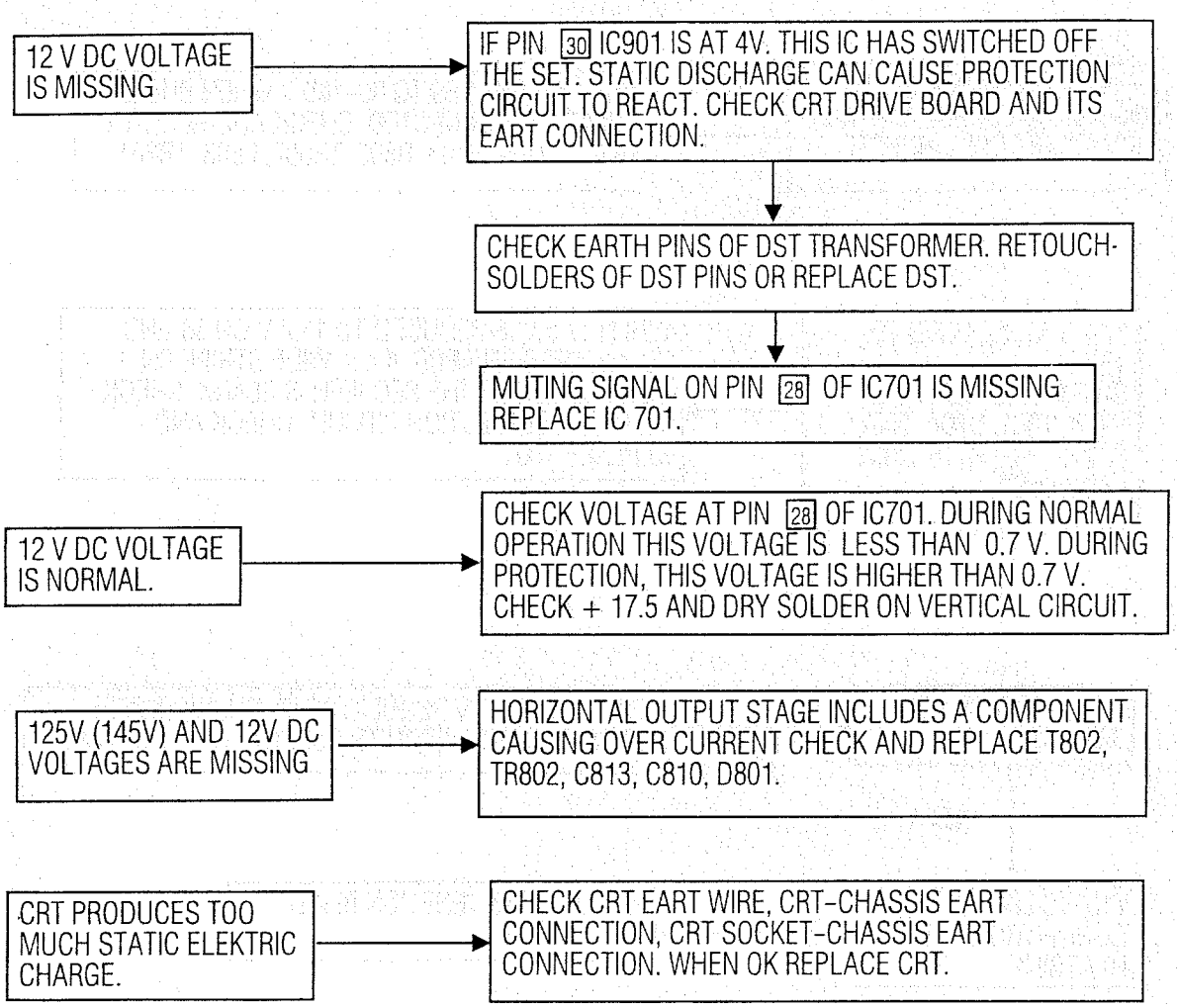
④
POWER II DEFECTS


PILOT LED IS ON
TV IS SWITCHED ON WITH POWER SWITCH. PILOT LED IS ON. TV IS OFF.
CHECK TEMP. CONTACT OF THE POWER SWITCH.
YES
THE BASE OF T903 SHOULD BE H WHEN POWER SWITCH IS PUSHED ON. CHECK. L SIGNAL AT PIN 30 OFF IC901
CHECK PIN 30 OF IC 901 IT SHOULD BE L.
NO
REPLACE IC 901.
CHECK AND REPLACE R917, R916 C909. CHECK AND DRY HUMUDITY ON TEMP CONTACT AND ON ITS CONNECTIONS.
REPLACE T902 TRANSISTOR AND IC T102. CHECK 17.5 V DC AND R121.
SET CAN NOT BE SWITCHED ON AND OFF WITH REMOTE CONTROL HAND UNIT.
REPLACE T903
CHECK PINS 23-25 OF IC901. OBSERVE A SIGNAL WHEN THE KEYS OF REMOTE CONTROL HAND SET UNIT ARE PRESSED.
NO
CHECK SIGNAL OUTPUT OF IR LED. IF THERE IS NO SIGNAL SHECK BATTERY VOLTAGE.
IF HAND UNIT IS OK, CHECK IR RECEIVER AND 5V SUPPLY VOLTAGE AND D904.
NORMAL
OK
CHECK AND REPLACE IC 901.
CHECK ST04 CONNECTOR AND CABLES.
NORMAL
CHECK D901 AND CUPPER PATTERN.

⑤
SWITCH MODE TRANSFORMER TR101 AND PERIPERIAL DEFECTS

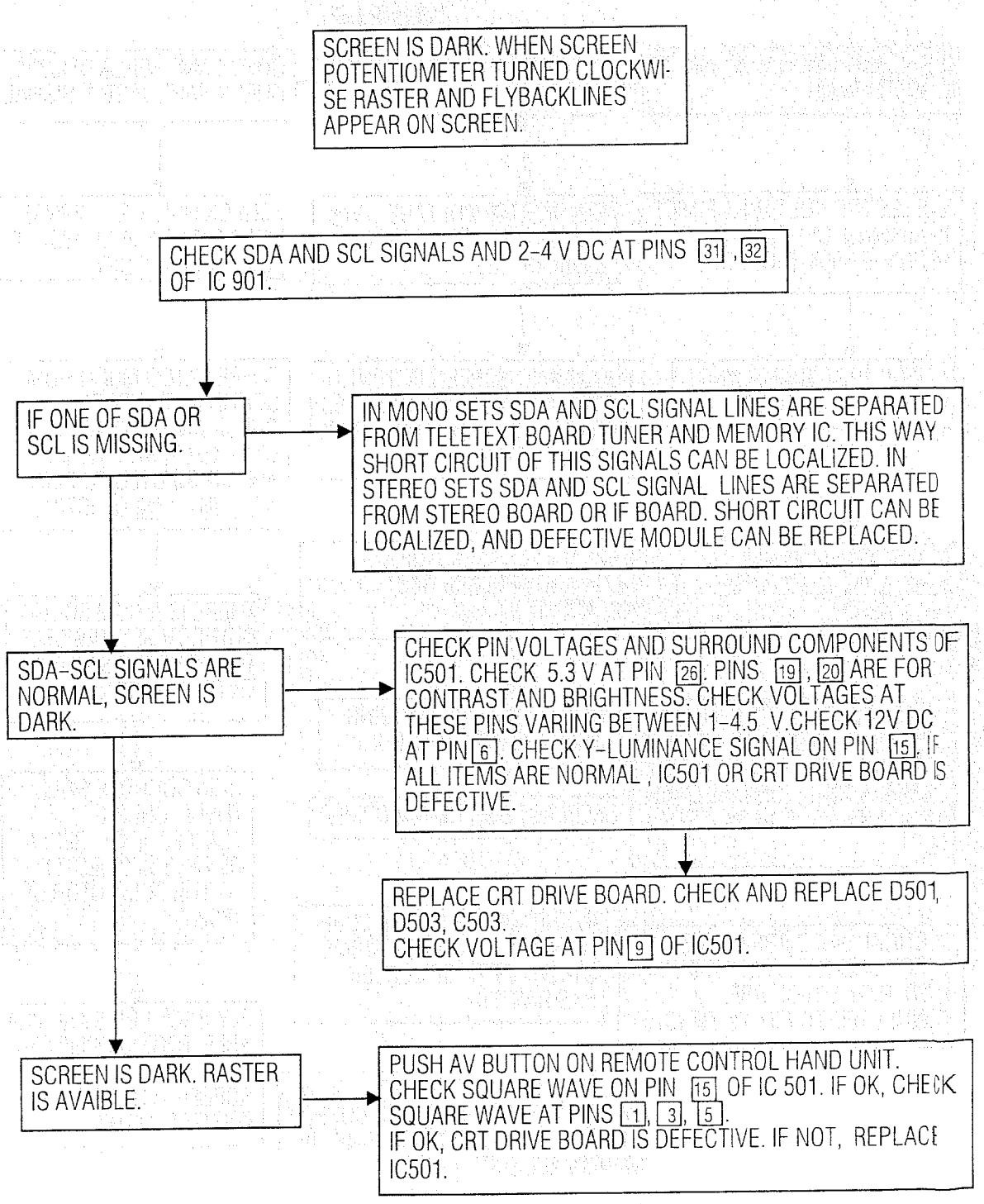

125V (145V) INCREASES TO 140-150 V (160-180V) WHEN BU 802 SOCKET DISCONNECTED
YES
125 V DECREASES TO 90-100 V WHEN BU802 SOCKET IS CONNECTED. CHECK AND REPLACE TR101, D105, P101, R805, TR802, L803, TR801
17.5 V IS REDUCED TO 16 V. CHECK AND REPLACE C707, T801, D704, T802 C125. T102, R116, D301 C131, C801.
WHEN 17.5 V IS REDUCED TO 16.2 V ON 63 AND 70 cm. SETS AN APPR. 4 cm. WIDE STRIPE ON LOWER EDGE OF THE SECREEN IS BLANK. CHECK VERTICAL DEFLECTION CIRCUIT. CHECK AND REPLACE T801.
12V IS MISSING OR TOO LOW.
CHECK T102, 12V REGULATOR IC. CHECK ON/OFF CIRCUIT. CHECK CIRCUITS SUPPLIED WITH 12V DC.
NORMAL
T102 IC LM117 CHECK CONNECTION WITH HEATSINK.
PICTURE HAS VENETION BLIND AND RIPPLE.

6
SET GOES TO STANDBY DURING OPERATION

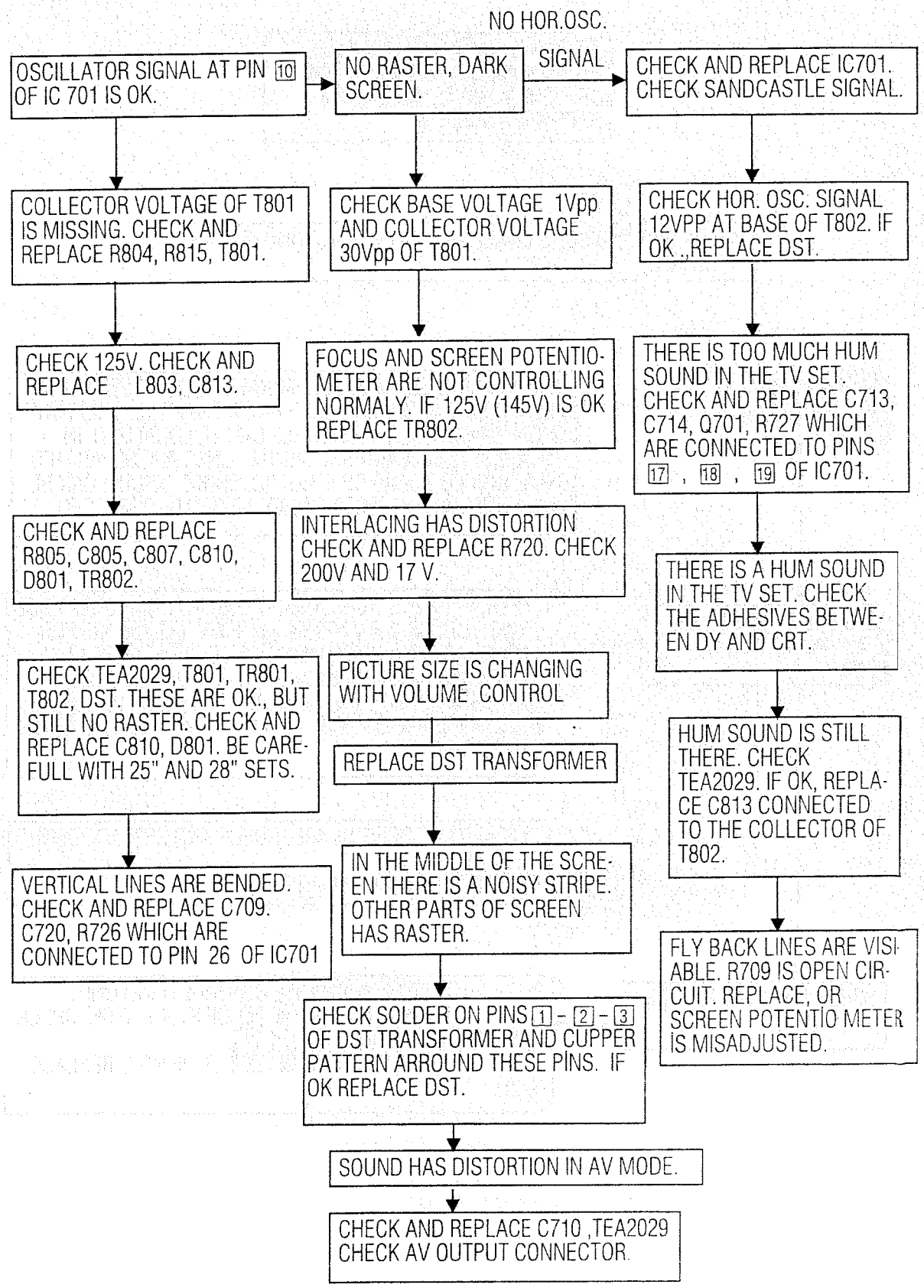

12 V DC VOLTAGE IS MISSING
IF PIN 30 IC901 IS AT 4V. THIS IC HAS SWITCHED OFF THE SET. STATIC DISCHARGE CAN CAUSE PROTECTION CIRCUIT TO REACT. CHECK CRT DRIVE BOARD AND ITS EART CONNECTION.
CHECK EARTH PINS OF DST TRANSFORMER. RETOUCH-SOLDERS OF DST PINS OR REPLACE DST.
MUTING SIGNAL ON PIN 28 OF IC701 IS MISSING REPLACE IC 701.
12 V DC VOLTAGE IS NORMAL.
CHECK VOLTAGE AT PIN 28 OF IC701. DURING NORMAL OPERATION THIS VOLTAGE IS LESS THAN 0.7 V. DURING PROTECTION, THIS VOLTAGE IS HIGHER THAN 0.7 V. CHECK + 17.5 AND DRY SOLDER ON VERTICAL CIRCUIT.
125V (145V) AND 12V DC VOLTAGES ARE MISSING
HORIZONTAL OUTPUT STAGE INCLUDES A COMPONENT CAUSING OVER CURRENT CHECK AND REPLACE T802, TR802, C813, C810, D801.
CRT PRODUCES TOO MUCH STATIC ELEKTRIC CHARGE.
CHECK CRT EART WIRE, CRT-CHASSIS EART CONNECTION, CRT SOCKET-CHASSIS EART CONNECTION. WHEN OK REPLACE CRT.

NOTICE: MAINS VOLTAGE OUTLETS IN COSTUMER HOUSE HAS TO BE CHECKED, BEFORE STARTING ANY OFF ABOVE MENTIONED MEASUREMENTS.

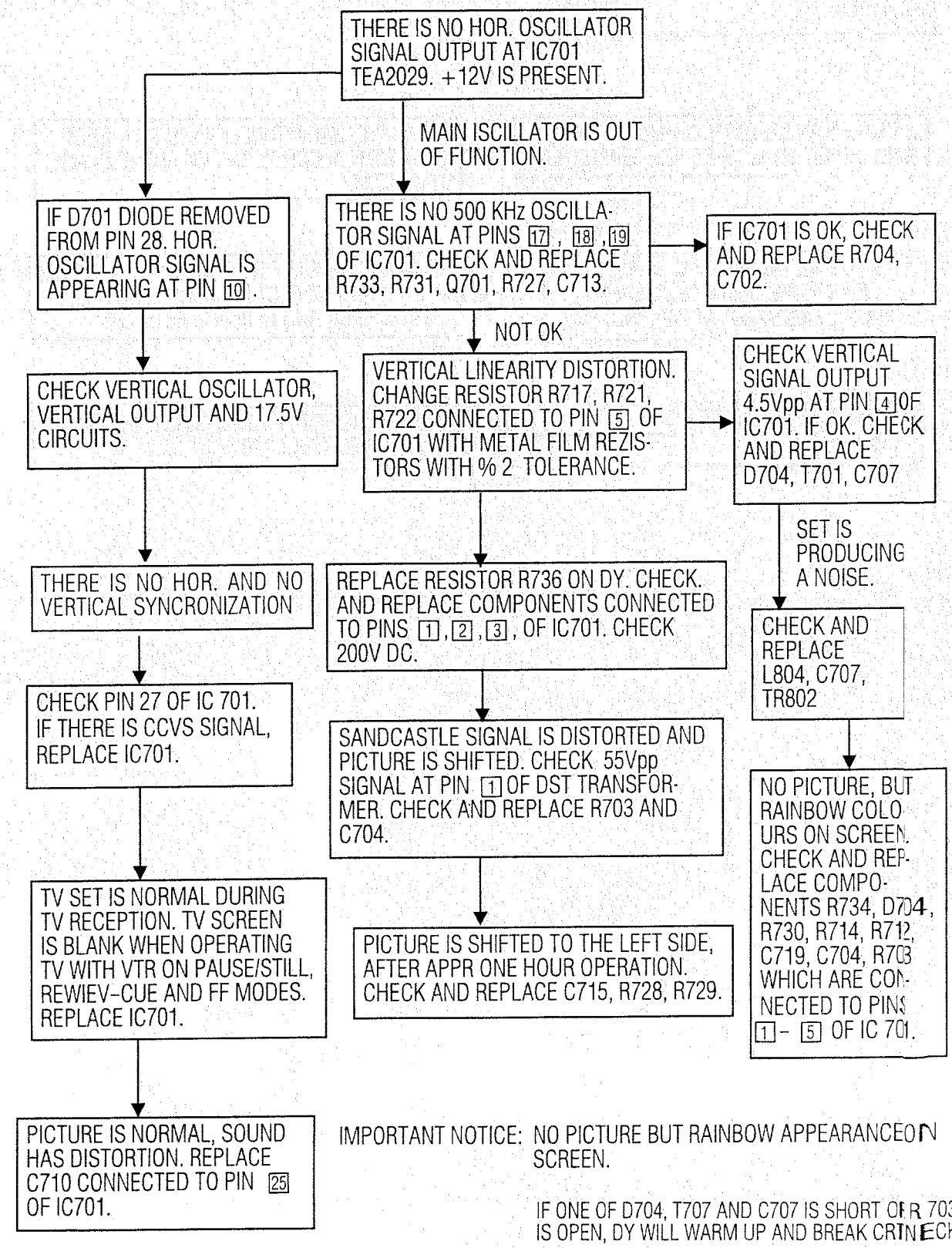
⑦


SCREEN IS DARK. WHEN SCREEN POTENTIOMETER TURNED CLOCKWISE RASTER AND FLYBACKLINES APPEAR ON SCREEN.
CHECK SDA AND SCL SIGNALS AND 2-4 V DC AT PINS [31] ,[32] OF IC 901.
IF ONE OF SDA OR SCL IS MISSING.
IN MONO SETS SDA AND SCL SIGNAL LİNES ARE SEPARATED FROM TELETEXT BOARD TUNER AND MEMORY IC. THIS WAY SHORT CIRCUIT OF THIS SIGNALS CAN BE LOCALIZED. IN STEREO SETS SDA AND SCL SIGNAL LINES ARE SEPARATED FROM STEREO BOARD OR IF BOARD. SHORT CIRCUIT CAN BE LOCALIZED, AND DEFECTIVE MODULE CAN BE REPLACED.
SDA-SCL SIGNALS ARE NORMAL, SCREEN IS DARK.
CHECK PIN VOLTAGES AND SURROUND COMPONENTS OF IC501. CHECK 5.3 V AT PIN [26]. PINS [19] , [20] ARE FOR CONTRAST AND BRIGHTNESS. CHECK VOLTAGES AT THESE PINS VARIING BETWEEN 1-4.5 V.CHECK 12V DC AT PIN [6]. CHECK Y-LUMINANCE SIGNAL ON PIN [15]. IF ALL ITEMS ARE NORMAL , IC501 OR CRT DRIVE BOARD IS DEFECTIVE.
REPLACE CRT DRIVE BOARD. CHECK AND REPLACE D501, D503, C503.
CHECK VOLTAGE AT PIN [9] OF IC501.
SCREEN IS DARK. RASTER IS AVAIBLE.
PUSH AV BUTTON ON REMOTE CONTROL HAND UNIT. CHECK SQUARE WAVE ON PIN [15] OF IC 501. IF OK, CHECK SQUARE WAVE AT PINS [1], [3], [5].
IF OK, CRT DRIVE BOARD IS DEFECTIVE. IF NOT, REPLACE IC501.

8
VERTICAL–HORIZONTAL OUTPUT AND DST CIRCUIT DEFECTS

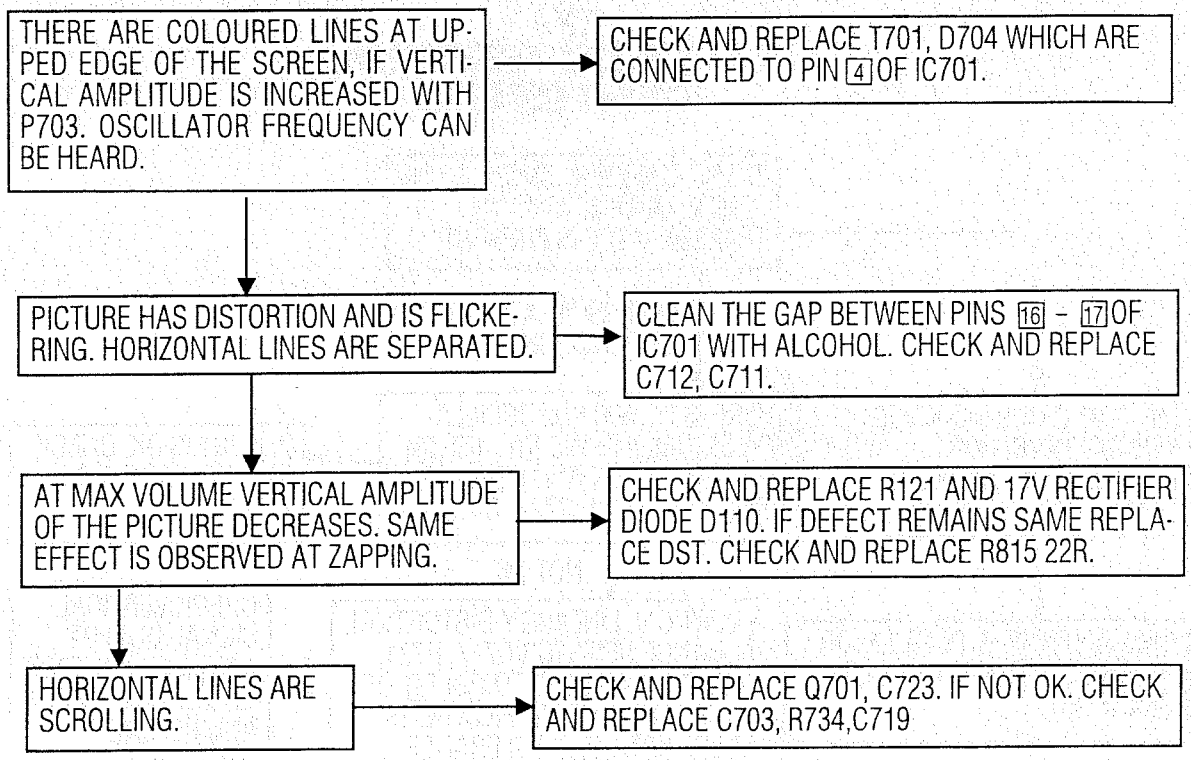

NO HOR.OSC.
OSCILLATOR SIGNAL AT PIN 10 OF IC 701 IS OK.
NO RASTER, DARK SCREEN.
SIGNAL
CHECK AND REPLACE IC701. CHECK SANDCASTLE SIGNAL.
COLLECTOR VOLTAGE OF T801 IS MISSING. CHECK AND REPLACE R804, R815, T801.
CHECK BASE VOLTAGE 1Vpp AND COLLECTOR VOLTAGE 30Vpp OF T801.
CHECK HOR. OSC. SIGNAL 12VPP AT BASE OF T802. IF OK ,REPLACE DST.
CHECK 125V. CHECK AND REPLACE L803, C813.
FOCUS AND SCREEN POTENTIO-METER ARE NOT CONTROLLING NORMALY. IF 125V (145V) IS OK REPLACE TR802.
THERE IS TOO MUCH HUM SOUND IN THE TV SET. CHECK AND REPLACE C713, C714, Q701, R727 WHICH ARE CONNECTED TO PINS 17 , 18 , 19 OF IC701.
CHECK AND REPLACE R805, C805, C807, C810, D801, TR802.
INTERLACING HAS DISTORTION CHECK AND REPLACE R720. CHECK 200V AND 17 V.
THERE IS A HUM SOUND IN THE TV SET. CHECK THE ADHESIVES BETWE-EN DY AND CRT.
CHECK TEA2029, T801, TR801, T802, DST. THESE ARE OK., BUT STILL NO RASTER. CHECK AND REPLACE C810, D801. BE CARE-FULL WITH 25" AND 28" SETS.
PICTURE SIZE IS CHANGING WITH VOLUME CONTROL
REPLACE DST TRANSFORMER
HUM SOUND IS STILL THERE. CHECK TEA2029. IF OK, REPLA-CE C813 CONNECTED TO THE COLLECTOR OF T802.
VERTICAL LINES ARE BENDED. CHECK AND REPLACE C709. C720, R726 WHICH ARE CONNECTED TO PIN 26 OF IC701
IN THE MIDDLE OF THE SCRE-EN THERE IS A NOISY STRIPE. OTHER PARTS OF SCREEN HAS RASTER.
FLY BACK LINES ARE VISI-ABLE. R709 IS OPEN CIR-CUIT. REPLACE, OR SCREEN POTENTİO METER İS MISADJUSTED.
CHECK SOLDER ON PINS 1 - 2 - 3 OF DST TRANSFORMER AND CUPPER PATTERN ARROUND THESE PİNS. IF OK REPLACE DST.
SOUND HAS DISTORTION IN AV MODE.
CHECK AND REPLACE C710 ,TEA2029 CHECK AV OUTPUT CONNECTOR.

9
TEA 2029 AND PERIPHERIAL CIRCUIT DEFECTS

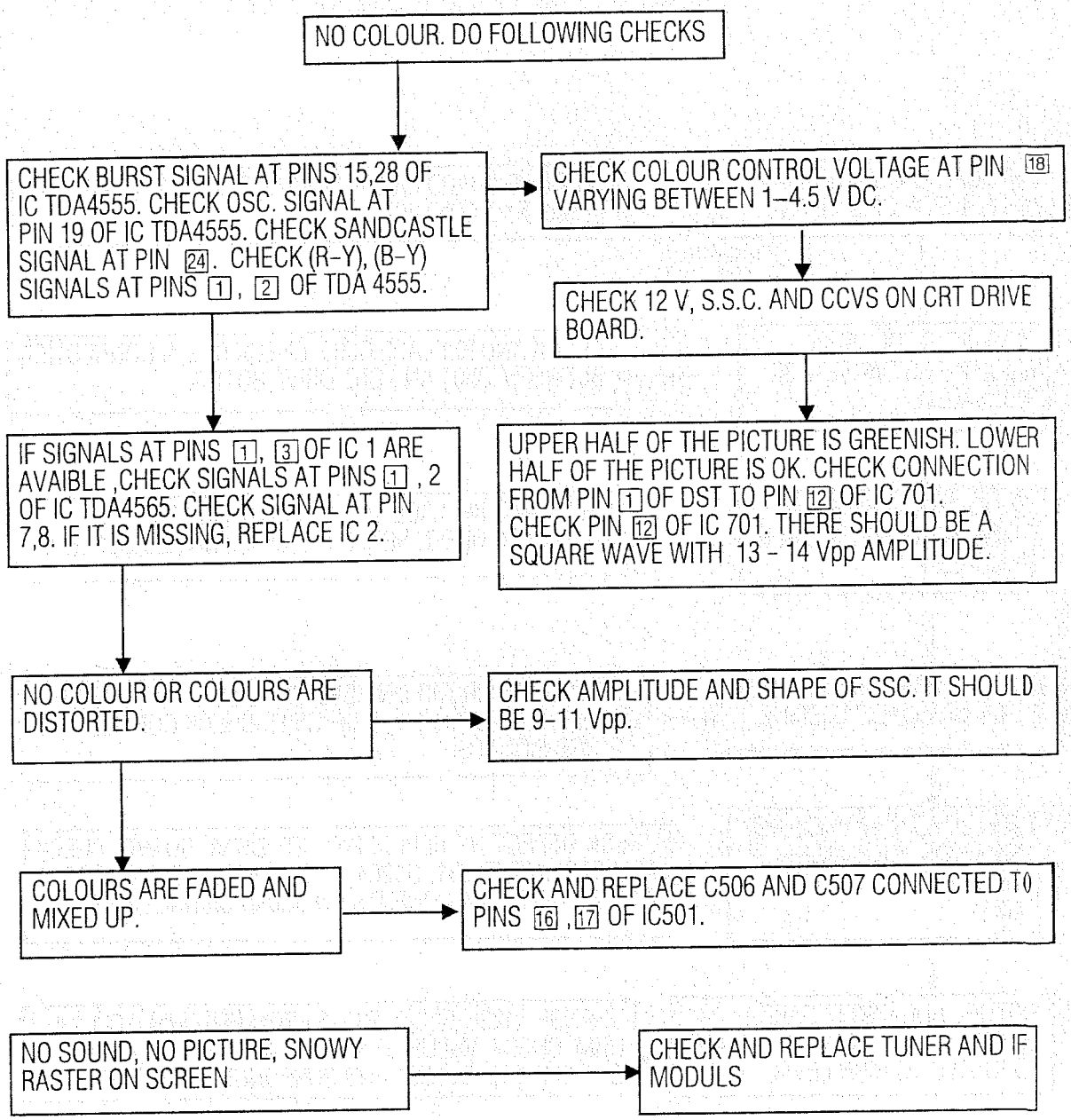

THERE IS NO HOR. OSCILLATOR SIGNAL OUTPUT AT IC701 TEA2029. +12V IS PRESENT.
MAIN ISCILLATOR IS OUT OF FUNCTION.
IF D701 DIODE REMOVED FROM PIN 28. HOR. OSCILLATOR SIGNAL IS APPEARING AT PIN 10 .
THERE IS NO 500 KHz OSCILLATOR SIGNAL AT PINS 17 , 18 ,19 OF IC701. CHECK AND REPLACE R733, R731, Q701, R727, C713.
IF IC701 IS OK, CHECK AND REPLACE R704, C702.
NOT OK
CHECK VERTICAL OSCILLATOR, VERTICAL OUTPUT AND 17.5V CIRCUITS.
VERTICAL LINEARITY DISTORTION. CHANGE RESISTOR R717, R721, R722 CONNECTED TO PIN 5 OF IC701 WITH METAL FILM REZISTORS WITH % 2 TOLERANCE.
CHECK VERTICAL SIGNAL OUTPUT 4.5Vpp AT PIN 4 0F IC701. IF OK. CHECK AND REPLACE D704, T701, C707
SET IS PRODUCING A NOISE.
THERE IS NO HOR. AND NO VERTICAL SYNCRONIZATION
REPLACE RESISTOR R736 ON DY. CHECK. AND REPLACE COMPONENTS CONNECTED TO PINS 1 , 2 , 3 , OF IC701. CHECK 200V DC.
CHECK AND REPLACE L804, C707, TR802
CHECK PIN 27 OF IC 701. IF THERE IS CCVS SIGNAL, REPLACE IC701.
SANDCASTLE SIGNAL IS DISTORTED AND PICTURE IS SHIFTED. CHECK 55Vpp SIGNAL AT PIN 1 OF DST TRANSFORMER. CHECK AND REPLACE R703 AND C704.
NO PICTURE, BUT RAINBOW COLOURS ON SCREEN. CHECK AND REPLACE COMPONENTS R734, D704, R730, R714, R712, C719, C704, R703 WHICH ARE CONNECTED TO PINS 1 - 5 OF IC 701.
TV SET IS NORMAL DURING TV RECEPTION. TV SCREEN IS BLANK WHEN OPERATING TV WITH VTR ON PAUSE/STILL, REWIEV-CUE AND FF MODES. REPLACE IC701.
PICTURE IS SHIFTED TO THE LEFT SIDE, AFTER APPR ONE HOUR OPERATION. CHECK AND REPLACE C715, R728, R729.
PICTURE IS NORMAL, SOUND HAS DISTORTION. REPLACE C710 CONNECTED TO PIN 25 OF IC701.

IMPORTANT NOTICE: NO PICTURE BUT RAINBOW APPEARANCE ON SCREEN.

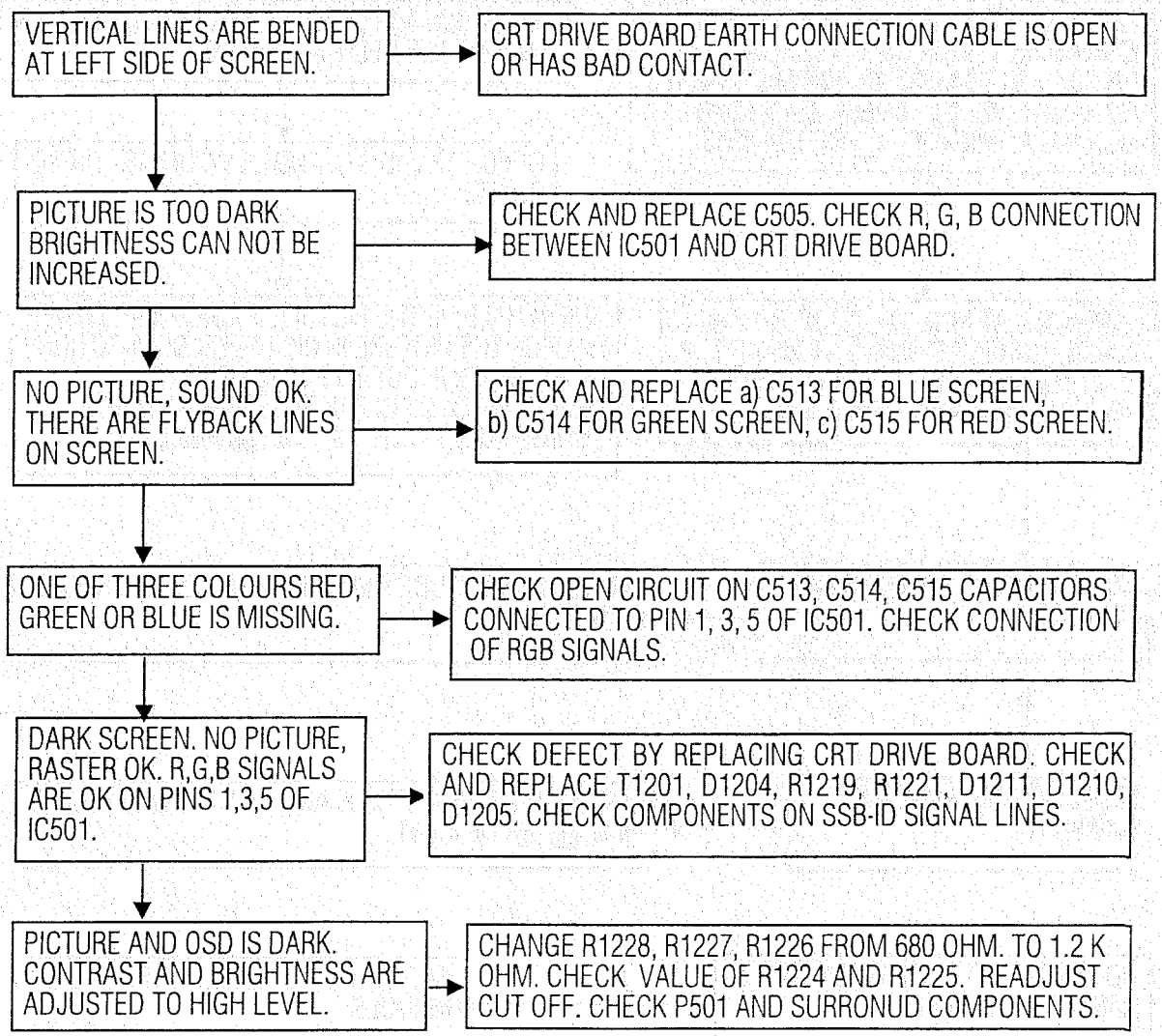
IF ONE OF D704, T707 AND C707 IS SHORT OR R 703 IS OPEN, DY WILL WARM UP AND BREAK CRT. CHECK.


THERE ARE COLOURED LINES AT UPPED EDGE OF THE SCREEN, IF VERTICAL AMPLITUDE IS INCREASED WITH P703. OSCILLATOR FREQUENCY CAN BE HEARD.
CHECK AND REPLACE T701, D704 WHICH ARE CONNECTED TO PIN 4 OF IC701.
PICTURE HAS DISTORTION AND IS FLICKERING. HORIZONTAL LINES ARE SEPARATED.
CLEAN THE GAP BETWEEN PINS 16 - 17 OF IC701 WITH ALCOHOL. CHECK AND REPLACE C712, C711.
AT MAX VOLUME VERTICAL AMPLITUDE OF THE PICTURE DECREASES. SAME EFFECT IS OBSERVED AT ZAPPING.
CHECK AND REPLACE R121 AND 17V RECTIFIER DIODE D110. IF DEFECT REMAINS SAME REPLACE DST. CHECK AND REPLACE R815 22R.
HORIZONTAL LINES ARE SCROLLING.
CHECK AND REPLACE Q701, C723. IF NOT OK. CHECK AND REPLACE C703, R734,C719

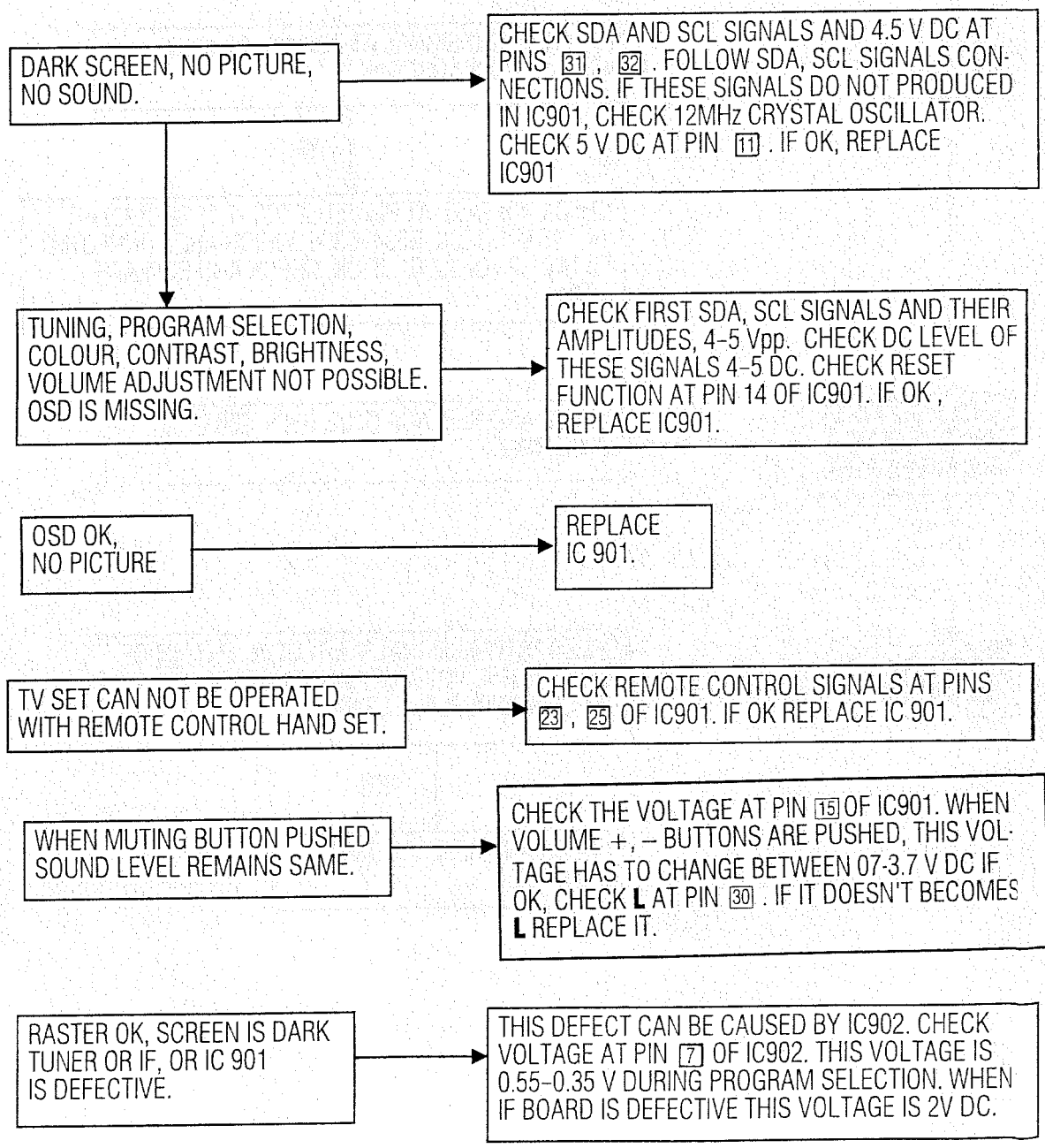
⑩
COLOUR DECODER DEFECTS


NO COLOUR. DO FOLLOWING CHECKS
CHECK BURST SIGNAL AT PINS 15,28 OF IC TDA4555. CHECK OSC. SIGNAL AT PIN 19 OF IC TDA4555. CHECK SANDCASTLE SIGNAL AT PIN 24. CHECK (R-Y), (B-Y) SIGNALS AT PINS 1, 2 OF TDA 4555.
CHECK COLOUR CONTROL VOLTAGE AT PIN 18 VARYING BETWEEN 1–4.5 V DC.
CHECK 12 V, S.S.C. AND CCVS ON CRT DRIVE BOARD.
IF SIGNALS AT PINS 1, 3 OF IC 1 ARE AVAIBLE ,CHECK SIGNALS AT PINS 1 , 2 OF IC TDA4565. CHECK SIGNAL AT PIN 7,8. IF IT IS MISSING, REPLACE IC 2.
UPPER HALF OF THE PICTURE IS GREENISH. LOWER HALF OF THE PICTURE IS OK. CHECK CONNECTION FROM PIN 1 OF DST TO PIN 12 OF IC 701. CHECK PIN 12 OF IC 701. THERE SHOULD BE A SQUARE WAVE WITH 13 - 14 Vpp AMPLITUDE.
NO COLOUR OR COLOURS ARE DISTORTED.
CHECK AMPLITUDE AND SHAPE OF SSC. IT SHOULD BE 9-11 Vpp.
COLOURS ARE FADED AND MIXED UP.
CHECK AND REPLACE C506 AND C507 CONNECTED TO PINS 16 ,17 OF IC501.
NO SOUND, NO PICTURE, SNOWY RASTER ON SCREEN
CHECK AND REPLACE TUNER AND IF MODULS

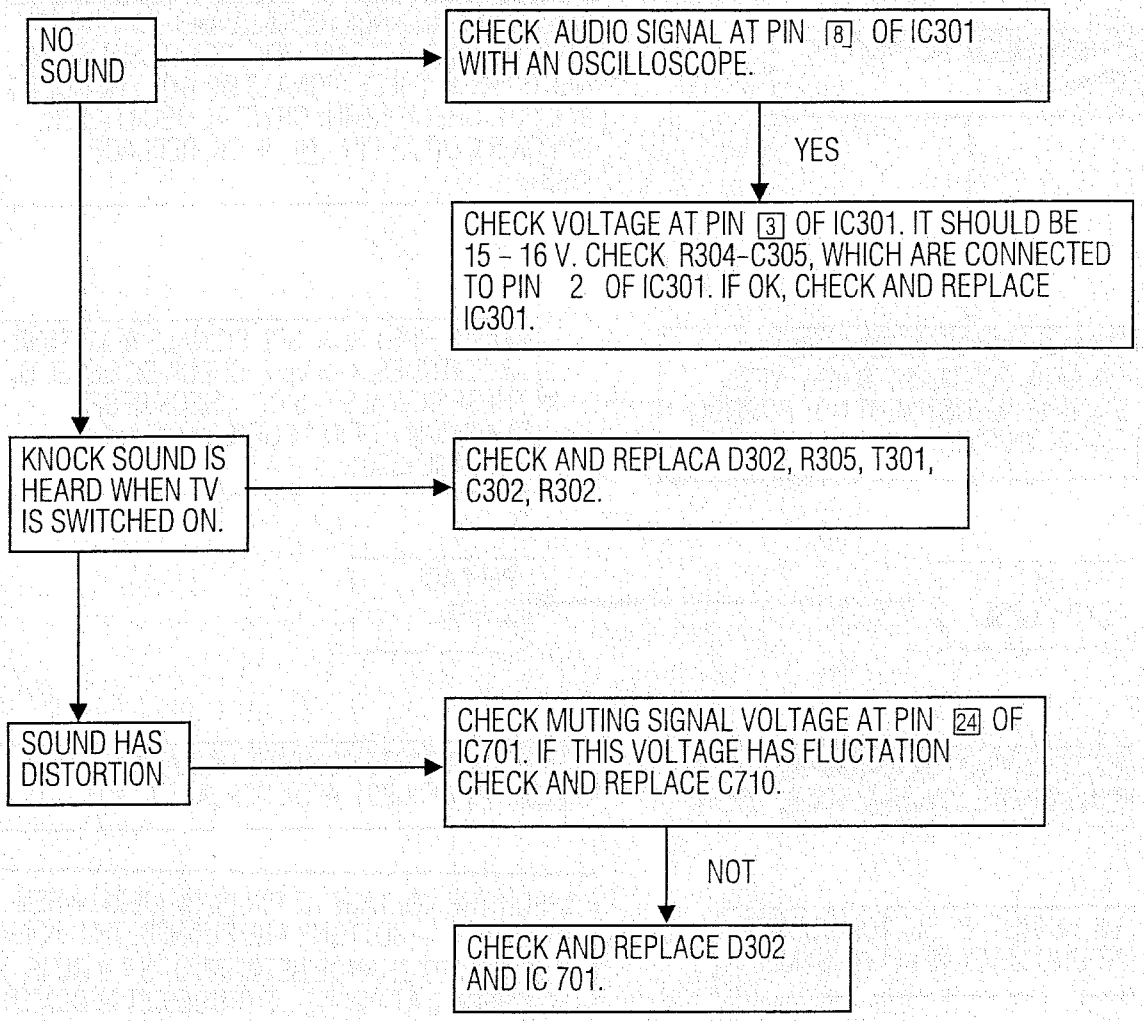
⑪
CRT DRIVE BOARD AND IC501 DEFECTS


VERTICAL LINES ARE BENDED AT LEFT SIDE OF SCREEN.
CRT DRIVE BOARD EARTH CONNECTION CABLE IS OPEN OR HAS BAD CONTACT.
PICTURE IS TOO DARK BRIGHTNESS CAN NOT BE INCREASED.
CHECK AND REPLACE C505. CHECK R, G, B CONNECTION BETWEEN IC501 AND CRT DRIVE BOARD.
NO PICTURE, SOUND OK. THERE ARE FLYBACK LINES ON SCREEN.
CHECK AND REPLACE a) C513 FOR BLUE SCREEN, b) C514 FOR GREEN SCREEN, c) C515 FOR RED SCREEN.
ONE OF THREE COLOURS RED, GREEN OR BLUE IS MISSING.
CHECK OPEN CIRCUIT ON C513, C514, C515 CAPACITORS CONNECTED TO PIN 1, 3, 5 OF IC501. CHECK CONNECTION OF RGB SIGNALS.
DARK SCREEN. NO PICTURE, RASTER OK. R,G,B SIGNALS ARE OK ON PINS 1,3,5 OF IC501.
CHECK DEFECT BY REPLACING CRT DRIVE BOARD. CHECK AND REPLACE T1201, D1204, R1219, R1221, D1211, D1210, D1205. CHECK COMPONENTS ON SSB-ID SIGNAL LINES.
PICTURE AND OSD IS DARK. CONTRAST AND BRIGHTNESS ARE ADJUSTED TO HIGH LEVEL.
CHANGE R1228, R1227, R1226 FROM 680 OHM. TO 1.2 K OHM. CHECK VALUE OF R1224 AND R1225. READJUST CUT OFF. CHECK P501 AND SURRONUD COMPONENTS.

⑫
MICROPROCESSOR IC 901 AND PERIPHERIAL CIRCUITRY DEFECTS

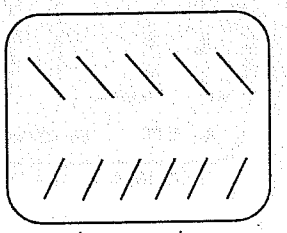

DARK SCREEN, NO PICTURE, NO SOUND.
CHECK SDA AND SCL SIGNALS AND 4.5 V DC AT PINS 31 , 32 . FOLLOW SDA, SCL SIGNALS CONNECTIONS. IF THESE SIGNALS DO NOT PRODUCED IN IC901, CHECK 12MHz CRYSTAL OSCILLATOR. CHECK 5 V DC AT PIN 11 . IF OK, REPLACE IC901
TUNING, PROGRAM SELECTION, COLOUR, CONTRAST, BRIGHTNESS, VOLUME ADJUSTMENT NOT POSSIBLE. OSD IS MISSING.
CHECK FIRST SDA, SCL SIGNALS AND THEIR AMPLITUDES, 4-5 Vpp. CHECK DC LEVEL OF THESE SIGNALS 4-5 DC. CHECK RESET FUNCTION AT PIN 14 OF IC901. IF OK , REPLACE IC901.
OSD OK, NO PICTURE
REPLACE IC 901.
TV SET CAN NOT BE OPERATED WITH REMOTE CONTROL HAND SET.
CHECK REMOTE CONTROL SIGNALS AT PINS 23 , 25 OF IC901. IF OK REPLACE IC 901.
WHEN MUTING BUTTON PUSHED SOUND LEVEL REMAINS SAME.
CHECK THE VOLTAGE AT PIN 15 OF IC901. WHEN VOLUME +, – BUTTONS ARE PUSHED, THIS VOLTAGE HAS TO CHANGE BETWEEN 07-3.7 V DC IF OK, CHECK L AT PIN 30 . IF IT DOESN'T BECOMES L REPLACE IT.
RASTER OK, SCREEN IS DARK TUNER OR IF, OR IC 901 IS DEFECTIVE.
THIS DEFECT CAN BE CAUSED BY IC902. CHECK VOLTAGE AT PIN 7 OF IC902. THIS VOLTAGE IS 0.55-0.35 V DURING PROGRAM SELECTION. WHEN IF BOARD IS DEFECTIVE THIS VOLTAGE IS 2V DC.

⑬
SOUND CIRCUIT DEFECTS

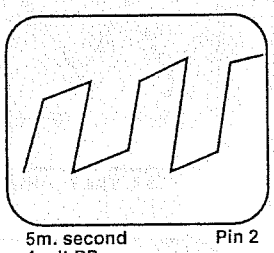

NO SOUND
CHECK AUDIO SIGNAL AT PIN [8] OF IC301 WITH AN OSCILLOSCOPE.
YES
CHECK VOLTAGE AT PIN [3] OF IC301. IT SHOULD BE 15 - 16 V. CHECK R304-C305, WHICH ARE CONNECTED TO PIN 2 OF IC301. IF OK, CHECK AND REPLACE IC301.
KNOCK SOUND IS HEARD WHEN TV IS SWITCHED ON.
CHECK AND REPLACA D302, R305, T301, C302, R302.
SOUND HAS DISTORTION
CHECK MUTING SIGNAL VOLTAGE AT PIN [24] OF IC701. IF THIS VOLTAGE HAS FLUCTATION CHECK AND REPLACE C710.
NOT
CHECK AND REPLACE D302 AND IC 701.

IC901 SDA 20563
OSCILLOSCOPE WAVE FORMS

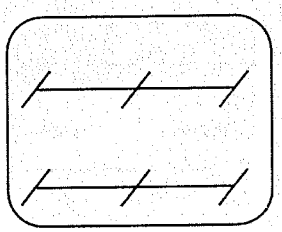
Pin No.
" 2
" 4
" 5
" 6
" 7
" 8



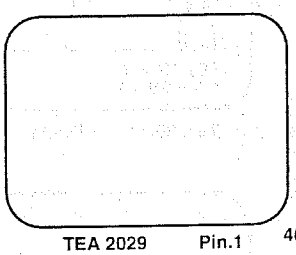
5 micro second
6v PP



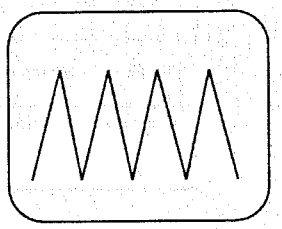
5m. second Pin 2
4volt PP



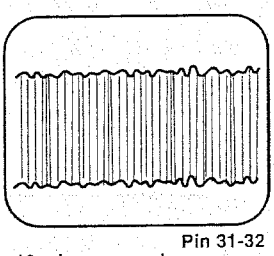
10 micro second
6 v PP



TEA 2029 Pin.1 460 mV

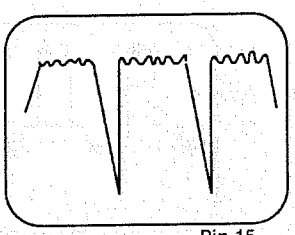


Pin 12-3
2 micro second
330 mV PP

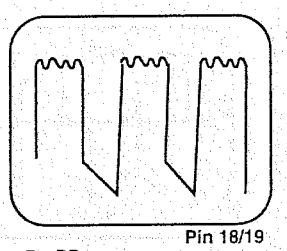


Pin 31-32
10 micro second
4,5 v PP

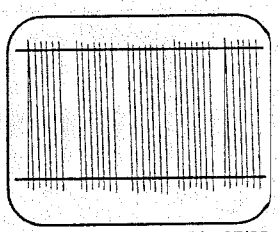
IC 501-TDA 4680
OSCILLOSCOPE WAVE FORMS



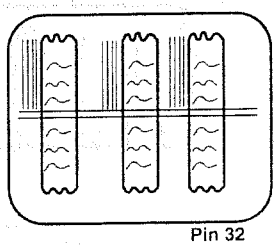
Pin-15
FUBK
0.6 v PP



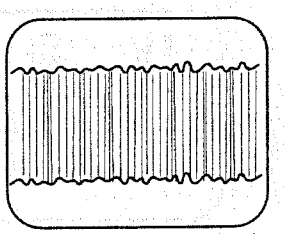
Pin 18/19
7 v PP
FUBK



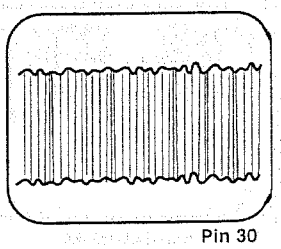
Pin 27/28
SDA-SCL
4,5 v PP



Pin 32
SCL
4.5 v PP

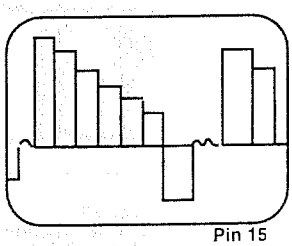


Pin 31
SDA
4,5 v PP

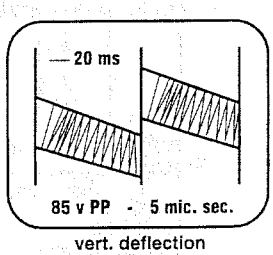


Pin 30
SCL
4,5 v PP

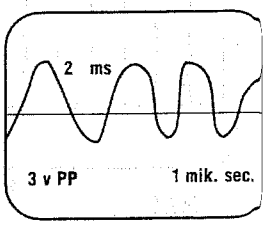
IC 701 TEA-2029
OSCILLOSCOPE WAVE FORMS



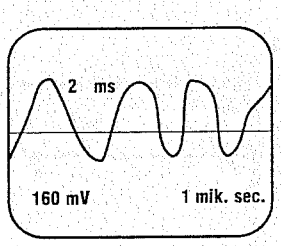
Pin 15
FUBK
0.6 v PP



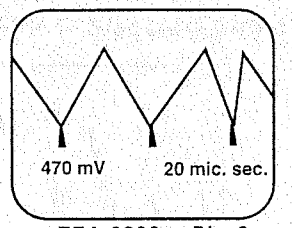
vert. deflection



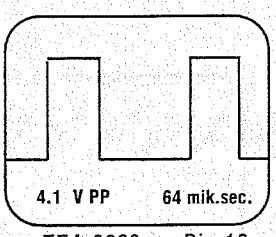
Pin 17



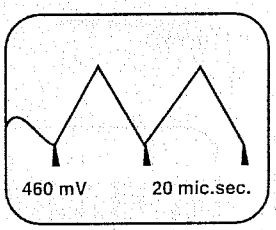
TEA 2029 Pin 18



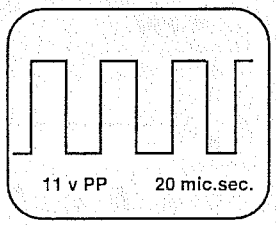
TEA 2029 Pin-2



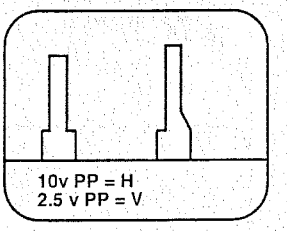
TEA 2029 Pin 10



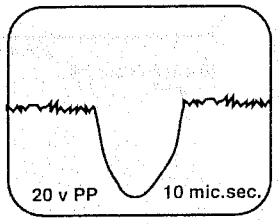
TEA 2029 Pin.1



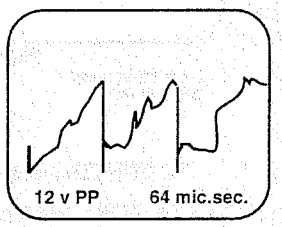
TEA 2029 Pin.4



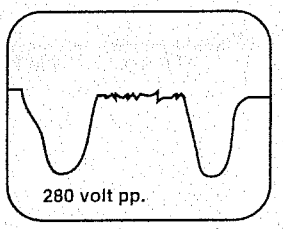
TEA 2029 Pin.11



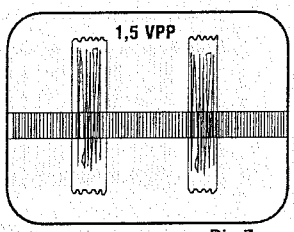
TEA 2029 Pin.12



Base of T802

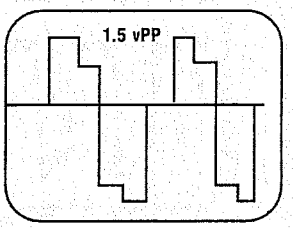


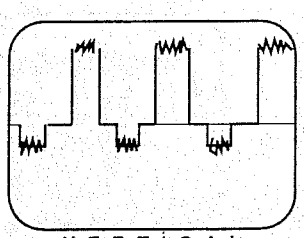
DST Transfarmer Pin 56



Pin 7

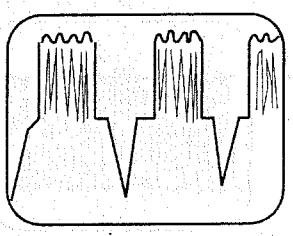
IC 501
R-Y
1.5 v PP



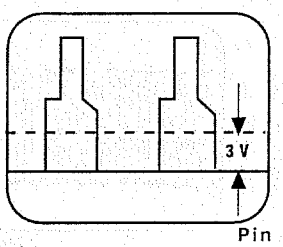


Pin 8

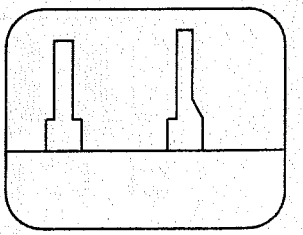
IC 501
Y. Lüminans
0.7 v PP



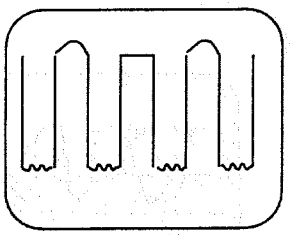
HORİZONTAL



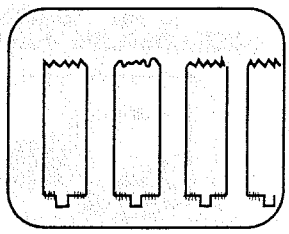
Pin 14
IC 501
SSC
9v PP



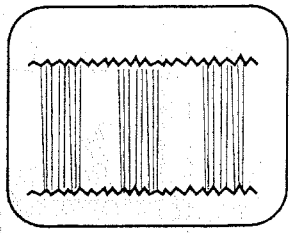
Pin 33
3.6v PP
10 Micro second



Pin 38
3.5v PP
20 micro second
When OSD visible



Pin 35, 36, 37
R.G.B.
650 m. volt
20 micro second



Pin :23
1.25v PP
20 micro second
When R/C ON

CHANNEL TABLE FOR STANDARD B/G (CCIR)

Channel number (display)	Channel design.	Centre frequency (MHz)	Oscillator frequency (MHz)	Division ratio PLL (decimal)
C01	AU 0	46.25	85.125	1.362
C02	K2	48.25	87.125	1.394
C03	K3	55.25	94.125	1.506
C04	K4	62.25	101.125	1.618
C05	K5	175.25	214.125	3.426
C06	K6	182.25	221.125	3.538
C07	K7	189.25	228.125	3.650
C08	K8	196.25	235.125	3.762
C09	K9	203.25	252.125	3.874
C10	K10	210.25	249.125	3.986
C11	K11	217.25	256.125	4.098
C12	K12	224.25	263.125	4.210
C13	A	53.75	92.625	1.482
C14	B	62.25	101.125	1.618
C15	C	82.25	121.125	1.938
C16	D	175.25	214.125	3.426
C17	E	183.75	222.625	3.562
C18	F	192.25	231.125	3.698
C19	G	201.25	240.125	3.842
C20	H	210.25	249.125	3.986
C21	K21	475.25	510.125	8,162
C22	K22	479.25	518.125	8,290
C23	K23	487.25	526.125	8,418
C24	K24	495.25	534.125	8,546
C25	K25	503.25	542.125	8,674
C26	K26	511.25	550.125	8,802
C27	K27	519.25	558.125	8,930
C28	K28	527.25	566.125	9,058
C29	K29	535.25	574.125	9,186
C30	R30	543.25	582.125	9,314
C31	R31	551.25	590.125	9,442
C32	K32	559.25	598.125	9.570
C33	K33	567.25	606.125	9,698
C34	K34	575.25	614.125	9,826
C35	K35	583.25	622.125	9,954
C36	K36	591.25	630.125	10,082
C37	K37	599.25	638.125	10,210
C38	K38	607.25	646.125	10,338
C39	K39	615.25	654.125	10,466
C40	K40	623.25	662.125	10,594
C41	K41	631.25	670.125	10,722
C42	K42	639.25	678.125	10,850
C43	K43	647.25	686.125	10,978
C44	K44	655.25	694.125	11,106
C45	K45	663.25	702.125	11,234
C46	K46	671.25	710.125	11,362
C47	K47	679.25	718.125	11,490
C48	K48	687.25	726.125	11,618
C49	K49	695.25	734.125	11,746
C50	K50	703.25	742.125	11,874
C51	K51	711.25	750.125	12,002
C52	K52	719.25	758.125	12,130
C53	K53	727.25	766.125	12,258
C54	K54	735.25	774.125	12,386
C55	K55	743.25	782.125	12,514
C56	K56	751.25	790.125	12,642
C57	K57	759.25	798.125	12,770
C58	K58	767.25	806.125	12,898
C59	K59	775.25	814.125	13.026
C60	K60	783.25	822.125	13.154

Channel number (display)	Channel design.	Centre frequency (MHz)	Oscillator frequency (MHz)	Division ratio PLL (decimal)
C61	K61	791.25	830.125	13.282
C62	K62	799.25	838.125	13.410
C63	K63	807.25	846.125	13.538
C64	K64	815.25	854.125	13.666
C65	K65	823.25	862.125	13.794
C66	K66	831.25	870.125	13.922
C67	K67	839.25	878.125	14.050
C68	K68	847.25	886.125	14.178
C69	K69	855.25	894.125	14.306
C70	EX	863.25	902.125	14.434
C71	EX	871.25	910.125	14.562
C72	EX	879.25	918.125	14.690
C73	EX	887.25	926.125	14.818
C74	EX	69.25	108.125	1.730
C75	EX	76.25	115.125	1.842
C76	EX	83.25	122.125	1.954
C77	EX	90.25	129.125	2.066
C78	EX	97.25	136.125	2.178
C79	201	59.25	98.125	1.570
C80	501	93.25	132.125	2.114
S01	S1	105.25	144.125	2.306
S02	S2	112.25	151.125	2.418
S03	S3	119.25	158.125	2.530
S04	S4	126.25	165.125	2.642
S05	S5	133.25	172.125	2.754
S06	S6	140.25	179.125	2.866
S07	S7	147.25	186.125	2.978
S08	S8	154.25	193.125	3.090
S09	S9	161.25	200.125	3.202
S10	S10	168.25	207.125	3.314
S11	S11	231.25	270.125	4.322
S12	S12	238.25	277.125	4.434
S13	S13	245.25	284.125	4.546
S14	S14	252.25	291.125	4.658
S15	S15	259.25	298.125	4.770
S16	S16	266.25	305.125	4.882
S17	S17	273.25	312.125	4.994
S18	S18	280.25	319.125	5.106
S19	S19	287.25	326.125	5.218
S20	S20	294.25	333.125	5.330
S21	S21	303.25	342.125	5.474
S22	S22	311.25	350.125	5.602
S23	S23	319.25	358.125	5.730
S24	S24	327.25	366.125	5.858
S25	S25	335.25	374.125	5.986
S26	S26	343.25	382.125	6.050
S27	S27	351.25	390.125	6.242
S28	S28	359.25	398.125	6.370
S29	S29	367.25	406.125	6.498
S30	S30	375.25	414.125	6.626
S31	S31	383.25	422.125	6.754
S32	S32	391.25	430.125	6.882
S33	S33	399.25	438.125	7.010
S34	S34	407.25	446.125	7.138
S35	S35	415.25	454.125	7.266
S36	S36	423.25	462.125	7.394
S37	S37	431.25	470.125	7.522
S38	S38	439.25	478.125	7.650
S39	S39	447.25	486.125	7.778
S40	S40	455.25	494.125	7.906
S41	S41	463.25	502.125	8.034

CHANNEL FOR STANDARD I+

Channel number (display)	Channel design.	Centre frequency (MHz)	Oscillator frequency (MHz)	Division ratio PLL (decimal)
C01	R1	49.75	88.625	1,362
C02	R2	59.25	98.125	1,570
C03	R3	77.25	116.125	1,858
C04	R4	85.25	124.125	1,986
C05	R5	93.25	132.125	2,114
C06	R6	175.25	214.125	3,426
C07	R7	183.25	222.125	3,554
C08	R8	191.25	230.125	3,682
C09	R9	199.25	238.125	3,810
C10	R10	207.25	246.125	3,938
C11	R11	215.25	254.125	4,066
C12	R12	223.25	262.125	4,194
C21	R21	471.25	510.125	8,162
C22	R22	469.25	518.125	8,290
C23	R23	487.25	526.125	8,418
C24	R24	495.25	534.125	8,546
C25	R25	503.25	542.125	8,674
C26	R26	511.25	550.125	8,802
C27	R27	519.25	558.125	8,930
C28	R28	527.25	566.125	9,058
C29	R29	535.25	574.125	9,186
C30	R30	543.25	582.125	9,314
C31	R31	551.25	590.125	9,442
C32	R32	559.25	793.125	9,570
C33	R33	567.25	606.125	9,698
C34	R34	575.25	614.125	9,826
C35	R35	583.25	622.125	9,954
C36	R36	591.25	630.125	10,082
C37	R37	599.25	638.125	10,210
C38	R38	607.25	646.125	10,338
C39	R39	615.25	654.125	10,466
C40	R40	623.25	662.125	10,594
C41	R41	631.25	670.125	10,722
C42	R42	639.25	678.125	10,850
C43	R43	647.25	686.125	10,978
C44	R44	655.25	694.125	11,106
C45	R45	663.25	702.125	11,234
C46	R46	671.25	710.125	11,362
C47	R47	679.25	718.125	11,490
C48	R48	687.25	726.125	11,618
C49	R49	695.25	734.125	11,746
C50	R50	703.25	742.125	11,874
C51	R51	711.25	750.125	12,002
C52	R52	719.25	758.125	12,130
C53	R53	727.25	766.125	12,258
C54	R54	735.25	774.125	12,386
C55	R55	743.25	782.125	12,514
C56	R56	751.25	790.125	12,642
C57	R57	759.25	798.125	12,770
C58	R58	767.25	806.125	12,898
C59	R59	775.25	814.125	13,026
C60	R60	783.25	822.125	13,154

Channel number (display)	Channel design.	Centre frequency (MHz)	Oscillator frequency (MHz)	Division ratio PLL (decimal)
C61	R61	791.25	830.125	13,282
C62	R62	799.25	838.125	13,410
C63	R63	807.25	846.125	13,538
C64	R64	815.25	854.125	13,666
C65	R65	823.25	862.125	13,794
C66	R66	831.25	870.125	13,922
C67	R67	839.25	878.125	14,050
C68	R68	847.25	886.125	14.178
C69	R69	855.25	894.125	14,306
C70	170	863.25	902.125	14,434
C71	171	871.25	910.125	14,562
C72	172	879.25	918.125	14,690
C73	173	887.25	926.125	14,818
S01	S1	103.25	142.125	2.274
S02	S1	111.25	150.125	2,402
S03	S3	119.25	158.125	2,530
S04	S4	127.25	166.125	2.658
S05	S5	135.25	174.125	2,786
S06	S6	143.25	182.125	2,914
S07	S7	151.25	190.125	3,042
S08	S8	159.25	198.125	3,170
S09	S9	167.25	206.125	3,298
S10	S10	231.25	270.125	4,322
S11	S11	239.25	278.125	4,450
S12	S12	247.25	286.125	4.578
S13	S13	255.25	294.125	4,706
S14	S14	263.25	302.125	4,834
S15	S15	271.25	310.125	4,962
S16	S16	279.25	318.125	5,090
S17	S17	287.25	325.125	5,218
S18	S18	295.25	334.125	5,346
S19	S19	303.25	342.125	5,474
S11	S11	311.25	350.125	5,602
S23	S23	319.25	358.125	5,730
S24	S24	327.25	366.125	5,858
S25	S25	335.25	374.125	5,986
S26	S26	343.25	382.125	6,050
S27	S27	351.25	390.125	6,242
S28	S28	359.25	398.125	6,370
S29	S29	367.25	406.125	6,498
S30	S30	375.25	414.125	6,626
S31	S31	383.25	422.125	6,754
S32	S32	391.25	430.125	6,882
S33	S33	399.25	438.125	7,010
S34	S34	407.25	446.125	7,138
S35	S35	415.25	454.125	7,266
S36	S36	423.25	462.125	7,394
S37	S37	431.25	470.125	7,522
S38	S38	439.25	478.125	7,650
S39	S39	447.25	486.125	7,778
S40	S40	455.25	494.125	7,906
S41	S41	463.25	502.125	8,034

CHANNEL TABLE FOR STANDARD D/K (OIRT)

Channel number (display)	Channel design.	Centre frequency (MHz)	Oscillator frequency (MHz)	Division ratio PLL (decimal)
C01	R1	49.75	88.625	1.418
C02	R2	59.25	98.125	1.570
C03	R3	77.25	116.125	1.858
C04	R4	85.25	124.125	1.986
C05	R5	93.25	132.125	2.114
C06	R6	175.25	214.125	3.426
C07	R7	183.25	222.125	3.554
C08	R8	191.25	230.125	3.682
C09	R9	199.25	238.125	3.810
C10	R10	207.25	246.125	3.938
C11	R11	215.25	254.125	4.066
C12	R12	223.25	262.125	4.194
C21	R21	471.25	510.125	8,162
C22	R22	479.25	518.125	8,290
C23	R23	487.25	526.125	8,418
C24	R24	495.25	534.125	8,546
C25	R25	503.25	542.125	8,674
C26	R26	511.25	550.125	8,802
C27	R27	519.25	558.125	8,930
C28	R28	527.25	566.125	9,058
C29	R29	535.25	574.125	9,186
C30	R30	543.25	582.125	9,314
C31	R31	551.25	590.125	9,442
C32	R32	559.25	598.125	9.570
C33	R33	567.25	606.125	9,698
C34	R34	575.25	614.125	9,826
C35	R35	583.25	622.125	9,954
C36	R36	591.25	630.125	10,082
C37	R37	599.25	638.125	10,210
C38	R38	607.25	646.125	10,338
C39	R39	615.25	654.125	10,466
C40	R40	623.25	662.125	10,594
C41	R41	631.25	670.125	10,722
C42	R42	639.25	678.125	10,850
C43	R43	647.25	686.125	10,978
C44	R44	655.25	694.125	11,106
C45	R45	663.25	702.125	11,234
C46	R46	671.25	710.125	11,362
C47	R47	679.25	718.125	11,490
C48	R48	687.25	726.125	11,618
C49	R49	695.25	734.125	11,746
C50	R50	703.25	742.125	11,874
C51	R51	711.25	750.125	12,002
C52	R52	719.25	758.125	12,130
C53	R53	727.25	766.125	12,258
C54	R54	735.25	774.125	12,386
C55	R55	743.25	782.125	12,514
C56	R56	751.25	790.125	12,642
C57	R57	759.25	798.125	12,770
C58	R58	767.25	806.125	12,898
C59	R59	775.25	814.125	13.026
C60	R60	783.25	822.125	13.154
C61	K61	791.25	830.125	13.282
C62	K62	799.25	838.125	13.410
C63	K63	807.25	846.125	13.538
C64	K64	815.25	854.125	13.666
C65	K65	823.25	862.125	13.794

Channel number (display)	Channel design.	Centre frequency (MHz)	Oscillator frequency (MHz)	Division ratio PLL (decimal)
C61	R61	791.25	830.125	13.282
C62	R62	799.25	838.125	13.410
C63	R63	807.25	846.125	13.538
C64	R64	815.25	854.125	13.666
C65	R65	823.25	862.125	13.794
C66	R66	831.25	870.125	13.922
C67	R67	839.25	878.125	14.050
C68	R68	847.25	886.125	14.178
C69	R69	855.25	894.125	14.306
S01	S1	103.25	142.125	2.274
S02	S2	111.25	150.125	2.402
S03	S3	119.25	158.125	2.530
S04	S4	127.25	166.125	2.658
S05	S5	135.25	174.125	2.786
S06	S6	143.25	182.125	2.914
S07	S7	151.25	190.125	3.042
S08	S8	159.25	198.125	3.170
S09	S9	167.25	206.125	3.298
S10	S10	231.25	270.125	4.322
S11	S11	239.25	278.125	4.450
S12	S12	247.25	286.125	4.578
S13	S13	255.25	294.125	4.706
S14	S14	263.25	302.125	4.834
S15	S15	271.25	310.125	4.962
S16	S16	279.25	318.125	5.090
S17	S17	287.25	326.125	5.218
S18	S18	295.25	334.125	5.346
S19	S19	303.25	342.125	5.474
S22	S22	311.25	350.125	5.602
S23	S23	319.25	358.125	5.730
S24	S24	327.25	366.125	5.858
S25	S25	335.25	374.125	5.986
S26	S26	343.25	382.125	6.050
S27	S27	351.25	390.125	6.242
S28	S28	359.25	398.125	6.370
S29	S29	367.25	406.125	6.498
S30	S30	375.25	414.125	6.626
S31	S31	383.25	422.125	6.754
S32	S32	391.25	430.125	6.882
S33	S33	399.25	438.125	7.010
S34	S34	407.25	446.125	7.138
S35	S35	415.25	454.125	7.266
S36	S36	423.25	462.125	7.394
S37	S37	431.25	470.125	7.522
S38	S38	439.25	478.125	7.650
S39	S39	447.25	486.125	7.778
S40	S40	455.25	494.125	7.906
S41	S41	463.25	502.125	8.034

CHANNEL TABLE FOR STANDARD L

Channel number (display)	Channel design.	Centre frequency (MHz)	Oscillator frequency (MHz)	Division ratio PLL (decimal)
C02	L2	55.75	90.125	1.442
C03	L3	60.50	94.875	1.518
C04	L4	63.75	98.125	1.570
C05	L5	176.00	214.875	3.438
C06	L6	184.00	222.875	3.566
C07	L7	192.00	230.875	3.694
C08	L8	200.00	238.875	3.822
C09	L9	208.00	246.875	3.950
C10	L10	216.00	254.875	4.078
C11	LUX	189.25	228.125	3.650
C12	K6	182.25	221.125	3.538
C13	K8	196.25	235.125	3.762
C14	K10	210.25	249.125	3.986
C21	K21	471.25	510.125	8,162
C22	K22	479.25	518.125	8,290
C23	K23	487.25	526.125	8,418
C24	K24	495.25	534.125	8,546
C25	K25	503.25	543.025	8,674
C26	K26	511.25	550.125	8,802
C27	K27	519.25	558.125	8,930
C28	K28	527.25	566.125	9,058
C29	K29	535.25	574.125	9,186
C30	K30	543.25	583.025	9,314
C31	K31	551.25	590.125	9,442
C32	K32	559.25	598.125	9.570
C33	K33	567.25	606.125	9,698
C34	K34	575.25	614.125	9,826
C35	K35	583.25	623.025	9,954
C36	K36	591.25	630.125	10,082
C37	K37	599.25	638.125	10,210
C38	K38	607.25	646.125	10,338
C39	K39	615.25	654.125	10,466
C40	K40	623.25	663.025	10,594
C41	K41	631.25	670.125	10,722
C42	K42	639.25	678.125	10,850
C43	K43	647.25	686.125	10,978
C44	K44	655.25	694.125	11,106
C45	K45	663.25	702.125	11,234
C46	K46	671.25	710.125	11,362
C47	K47	679.25	718.125	11,490
C48	K48	687.25	726.125	11,618
C49	K49	695.25	734.125	11,746
C50	K50	703.25	742.125	11,874
C51	K51	711.25	750.125	12,002
C52	K52	719.25	758.125	12,130
C53	K53	727.25	766.125	12,258
C54	K54	735.25	774.125	12,386
C55	K55	743.25	782.125	12,514
C56	K56	751.25	790.125	12,642
C57	K57	759.25	798.125	12,770
C58	K58	767.25	806.125	12,898
C59	K59	775.25	814.125	13.026
C60	K60	783.25	822.125	13.154

Channel number (display)	Channel design.	Centre frequency (MHz)	Oscillator frequency (MHz)	Division ratio PLL (decimal)
C61	K61	791.25	830.125	13.282
C62	K62	799.25	838.125	13.410
C63	K63	807.25	846.125	13.538
C64	K64	815.25	854.125	13.666
C65	K65	823.25	862.125	13.794
C66	K66	831.25	870.125	13.922
C67	K67	839.25	878.125	14.050
C68	K68	847.25	886.125	14.178
C69	K69	855.25	894.125	14.306
C70	EX	863.25	902.125	14.434
S01	B	116.75	155.625	2.490
S02	C	128.75	167.625	2.682
S03	D	140.75	179.625	2.874
S04	E	152.75	191.625	3.066
S05	F	164.75	203.625	3.258
S06	G	176.75	215.625	3.450
S07	S	188.75	227.625	3.642
S08	I	200.75	239.625	3.834
S09	J	212.75	251.625	4.026
S10	K	224.75	263.625	4.218
S11	L	236.75	275.625	4.410
S12	M	248.75	287.625	4.602
S13	N	260.75	299.625	4.794
S14	O	272.75	311.625	4.986
S15	P	284.75	323.625	5.178
S16	Q	296.75	335.625	5.370
S21	S21	303.25	343.025	5.474
S22	S22	311.25	350.125	5.602
S23	S23	319.25	358.125	5.730
S24	S24	327.25	366.125	5.858
S25	S25	335.25	374.125	5.986
S26	S26	343.25	383.025	6.050
S27	S27	351.25	390.125	6.242
S28	S28	359.25	398.125	6.370
S29	S29	367.25	406.125	6.498
S30	S30	375.25	414.125	6.626
S31	S31	383.25	423.025	6.754
S32	S32	391.25	430.125	6.882
S33	S33	399.25	438.125	7.010
S34	S34	407.25	446.125	7.138
S35	S35	415.25	454.125	7.266
S36	S36	423.25	463.025	7.394
S37	S37	431.25	470.125	7.522
S38	S38	439.25	478.125	7.650
S39	S39	447.25	486.125	7.778
S40	S40	455.25	494.125	7.906
S41	S41	463.25	503.025	8.034

LOCAL CONTROL

IC 951
SFH 505

TUNER

TFK 2002PHC
SMSG TECC2989PA3G
SLCM SK1101

IF MONO MODUL

IC301 TDA 1138V

TELETEXT MODUL

SDA 5231
SDA 5248
uPD 4364-15L OR HYB 514256A-10

SDA 20563 A508

SDA 2586

PAL / SECAM

TDA 4555
TDA 4565

IC501 TDA 4680

SCART

CRT-MODUL

TDA 4605

90° 14"-22" SMALL RANGE

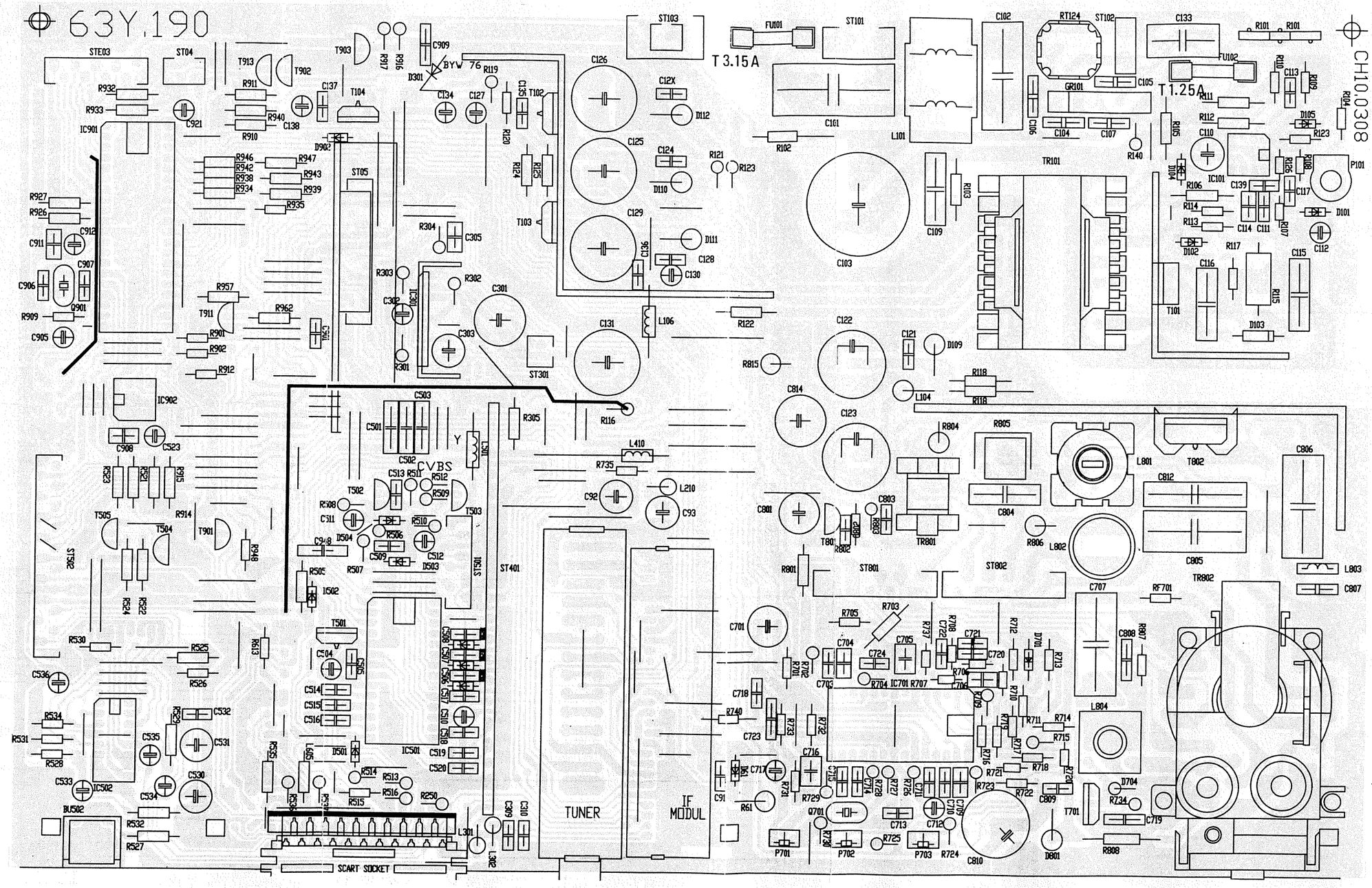
IC101

IC701 TEA 2029

E/W-MODUL

*D702-D703 are for FLAT SQUARE tubes.

MAIN CHASSIS 90⁰ MONO



LOCAL CONTROL

STAND-BY

ON/OFF

IC 951
SFH 505

TUNER

TFK 2002PHC
SMSG TECC2989PA3G
SLCM SK1101

IF STEREO MODUL

QPSK TO
STEREO-NICAM MODULE

TELETEXT MODUL

SDA 5231
SDA 5248
uPD 4364-15L OR HYB 514256A-10

SDA 20563 A508

SDA 2586

TO STEREO-MODUL

NOT CONNECTED ON MONO SETS

SCART

CRT-MODUL

PAL / SECAM

TDA 4555
TDA 4565

IC501 TDA 4680

STEREO/NICAM DECODER WITH
AF POWER AMPLIFIER

QPSK
FROM IF
MODULE

FROM SCART

TO SCART

FROM SMPS

FROM IF

110 25" - 28" RANGE

TDA 4605

IC101

IC701 TEA 2029

E/W-MODUL

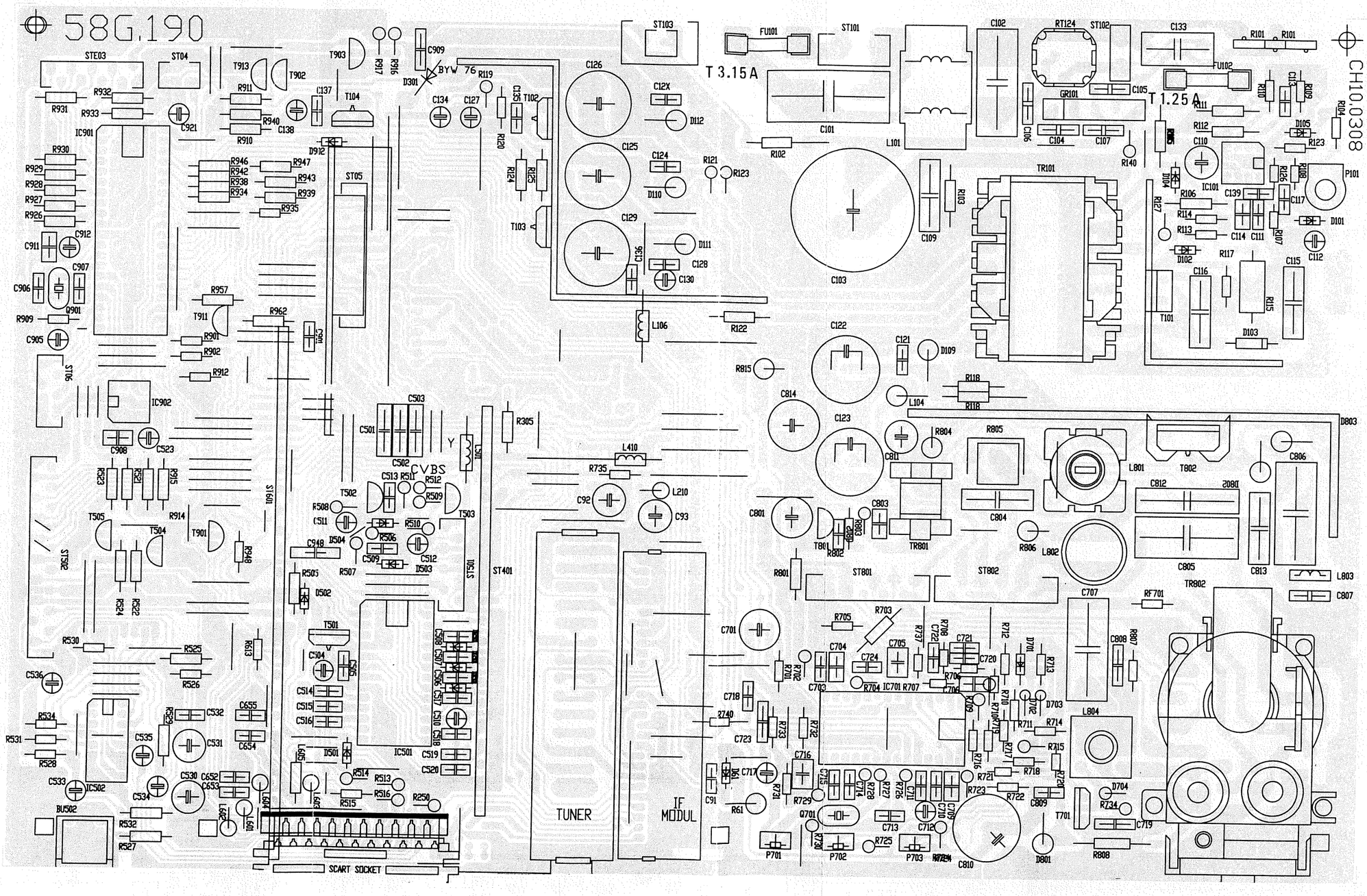
EW-OUT ST801/1

V-OUTPUT

H-OUTPUT

H-PULSE

MAIN CHASSIS 110° STEREO



LOCAL CONTROL

IC 951
SFH 505

STAND-BY

SDA 20563 A508

SDA 2586

TUNER

TFK 2002PHC
SMSG TECC2989PA3G
SLCM SK1101

IF STEREO MODUL

QDPSK TO
STEREO-NICAM MODULE

TO STEREO-MODUL

TELETEXT MODUL

SDA 5231
SDA 5248
uPD 4364-15L OR HYB 514256A-10

SCART

PAL / SECAM

TDA 4555
TDA 4565

IC501 TDA 4680

CRT-MODUL

STEREO/NICAM DECODER WITH
AF POWER AMPLIFIER

FROM IF

FROM SCART

TO SCART

FROM SMPS

TDA 4605

90° 14"-22" SMALL RANGE

IC70: TEA 2029

*D702-D703 are for FLAT SQUARE tubes.

MAIN CHASSIS 90⁰ STEREO